

FIG - 1

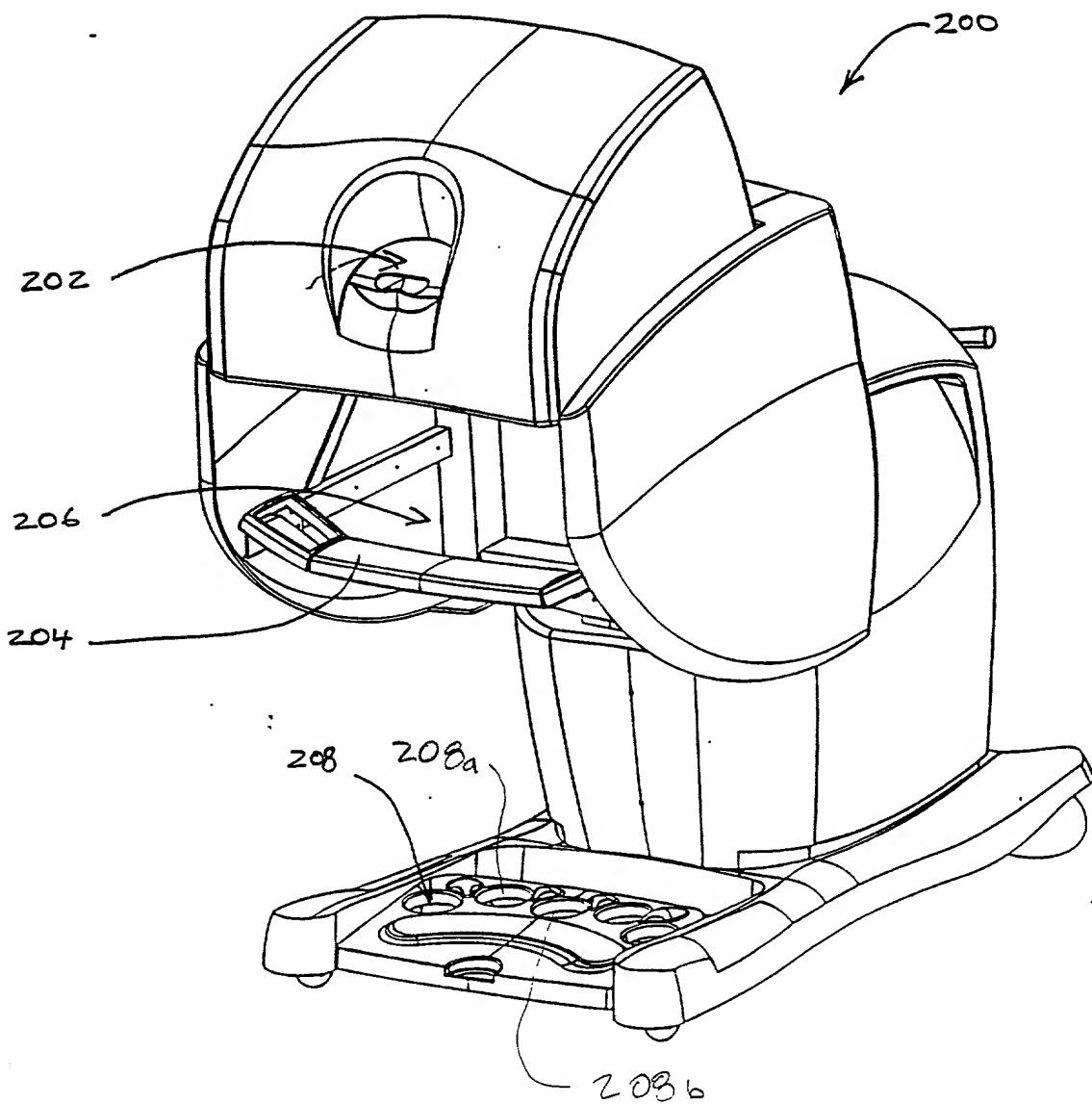


FIG 2

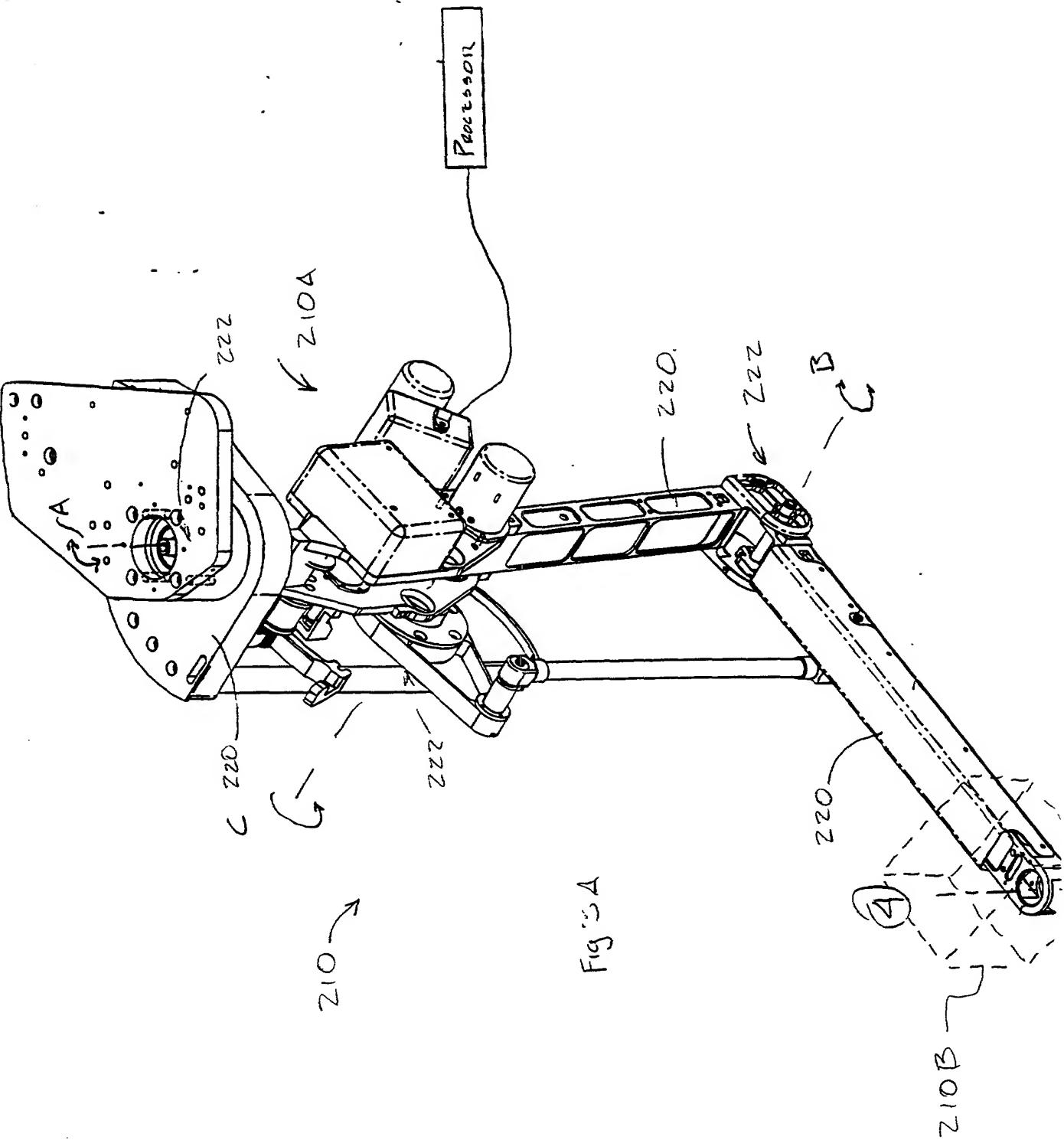
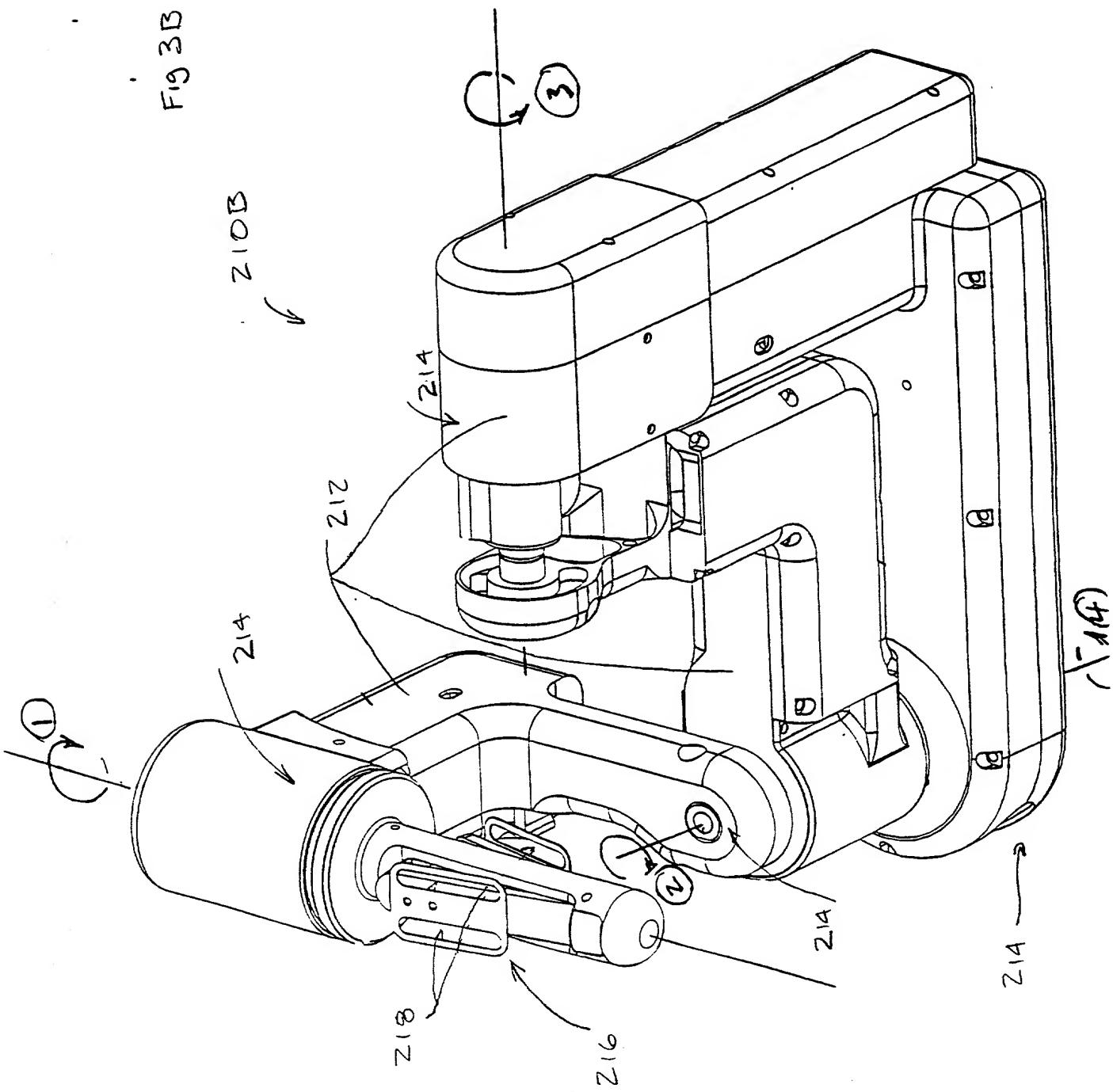
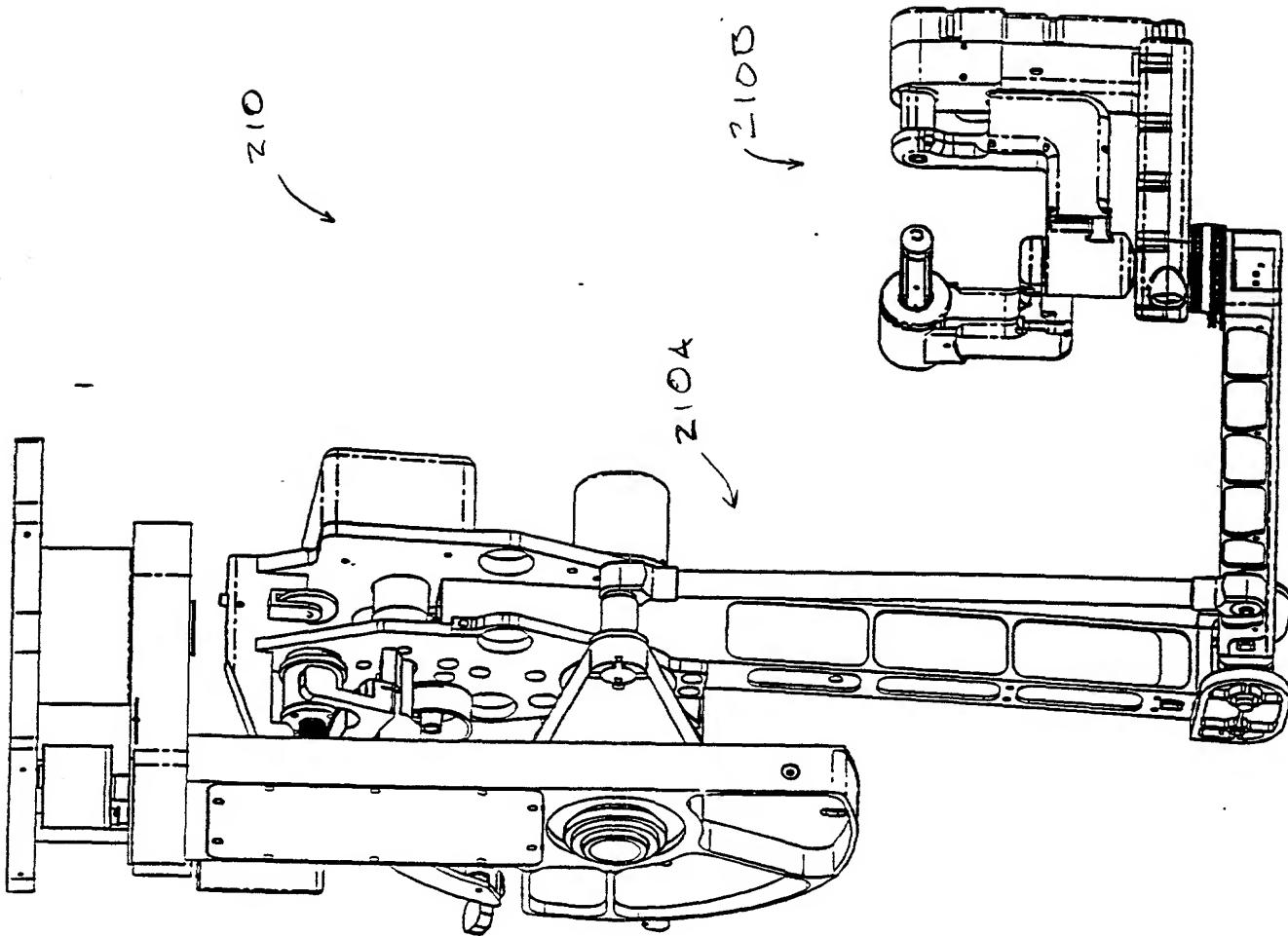


Fig 3B





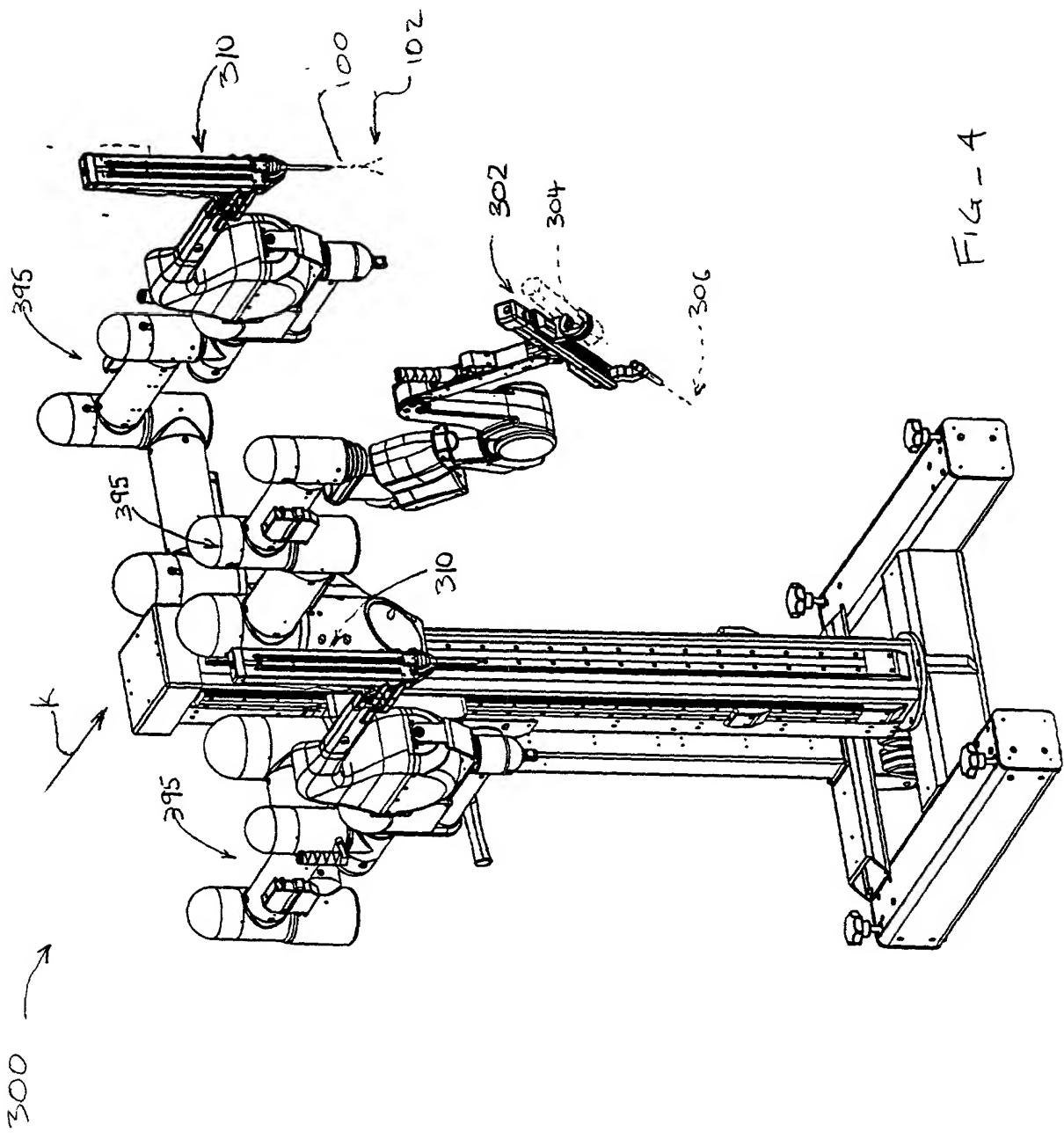


FIG - 4

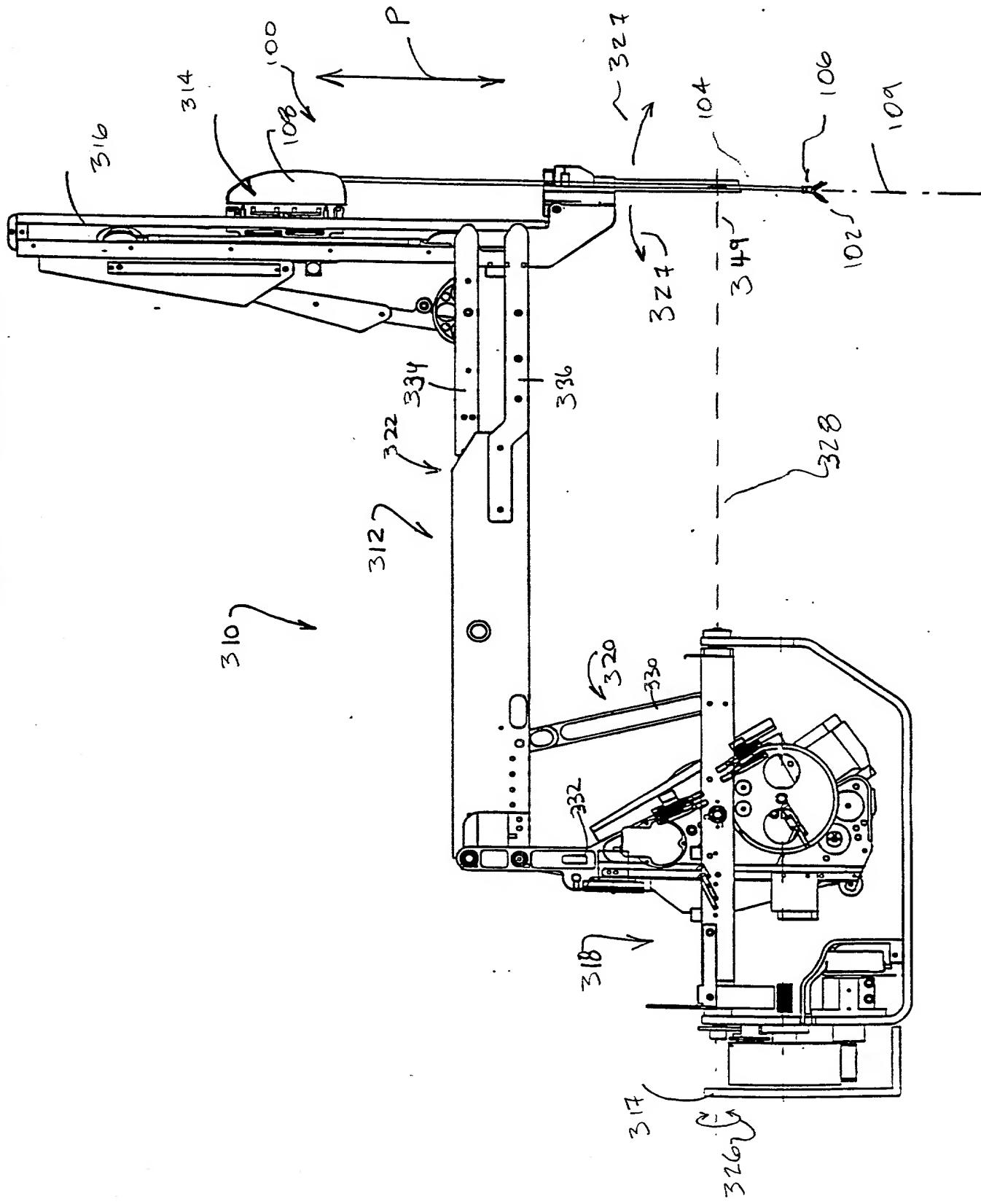


FIG - 5

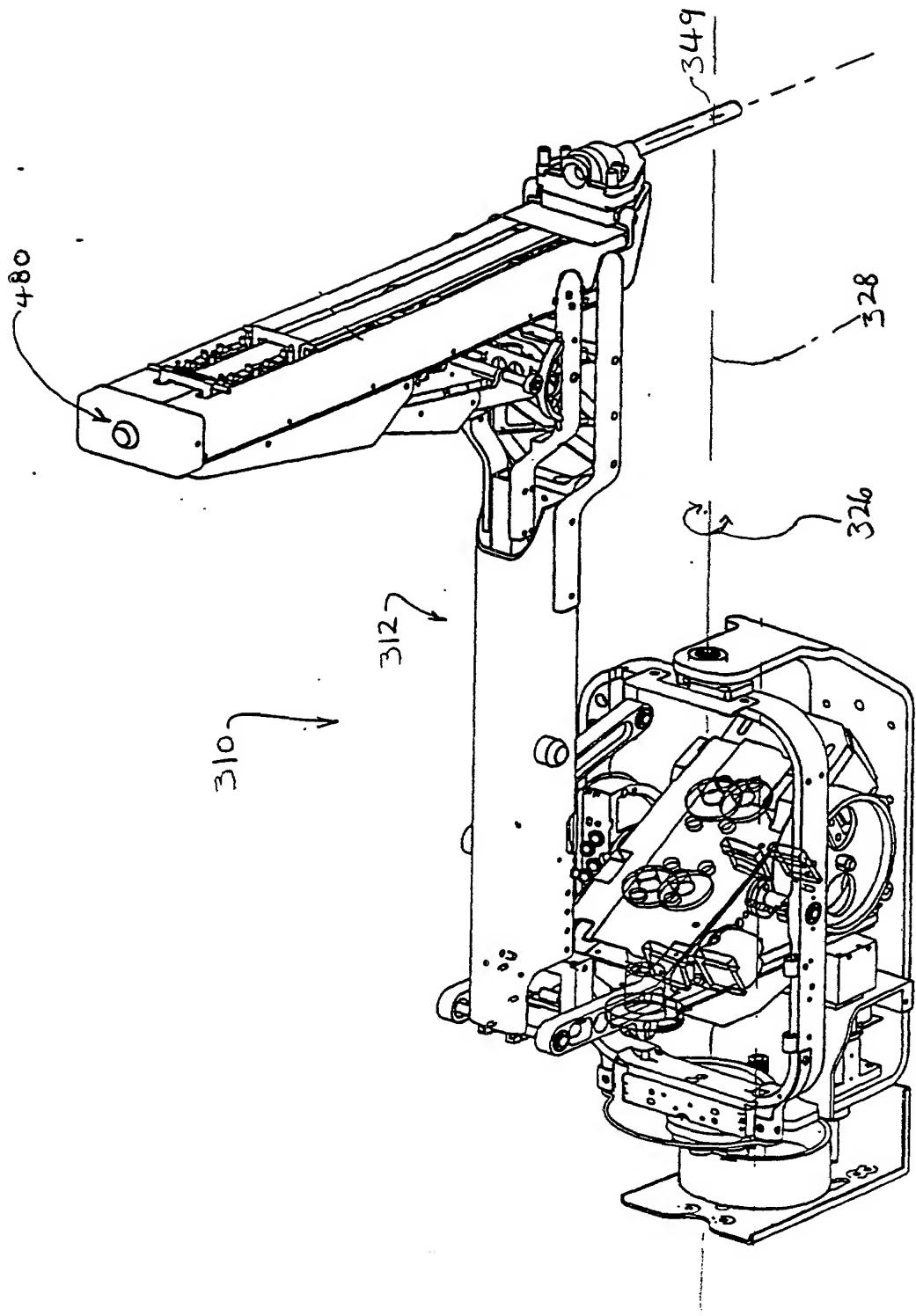


FIG - 5A

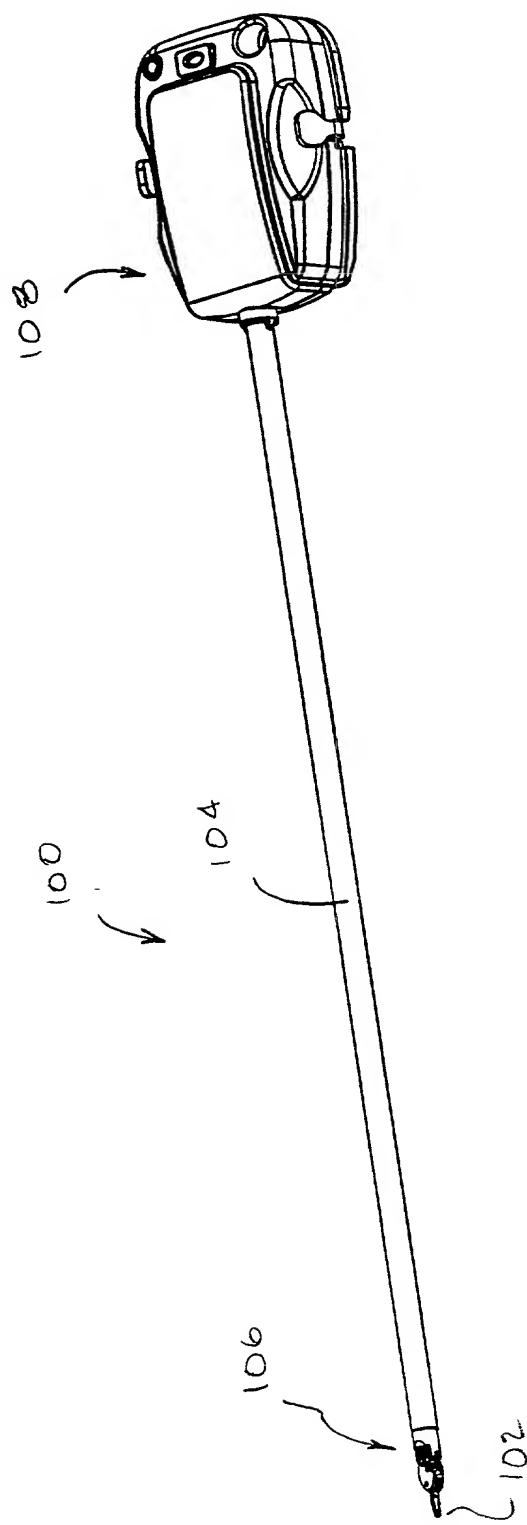
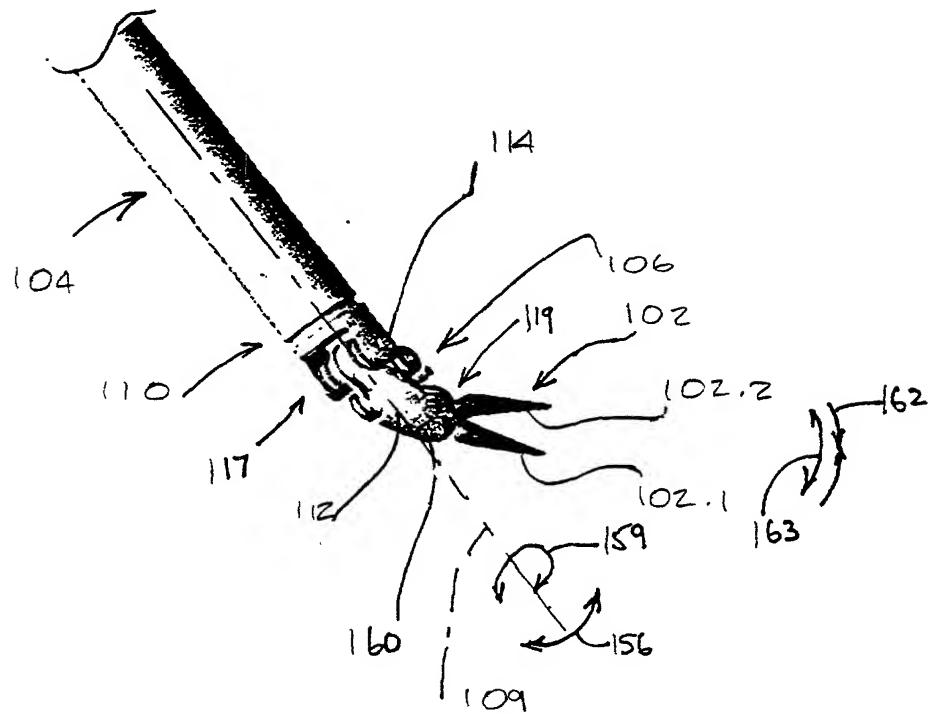
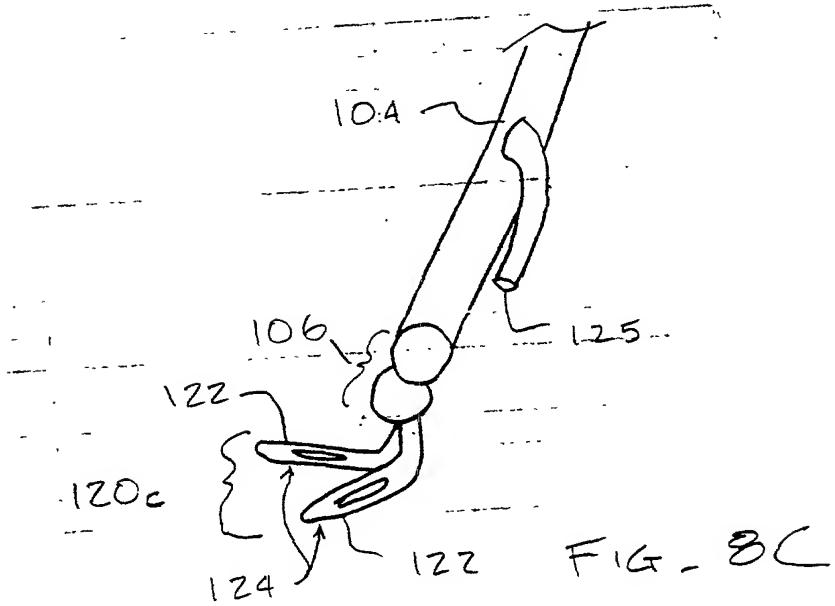
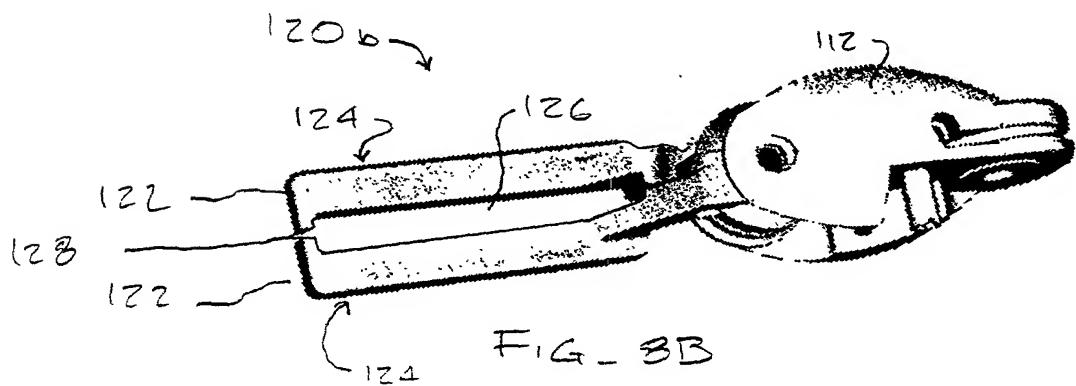
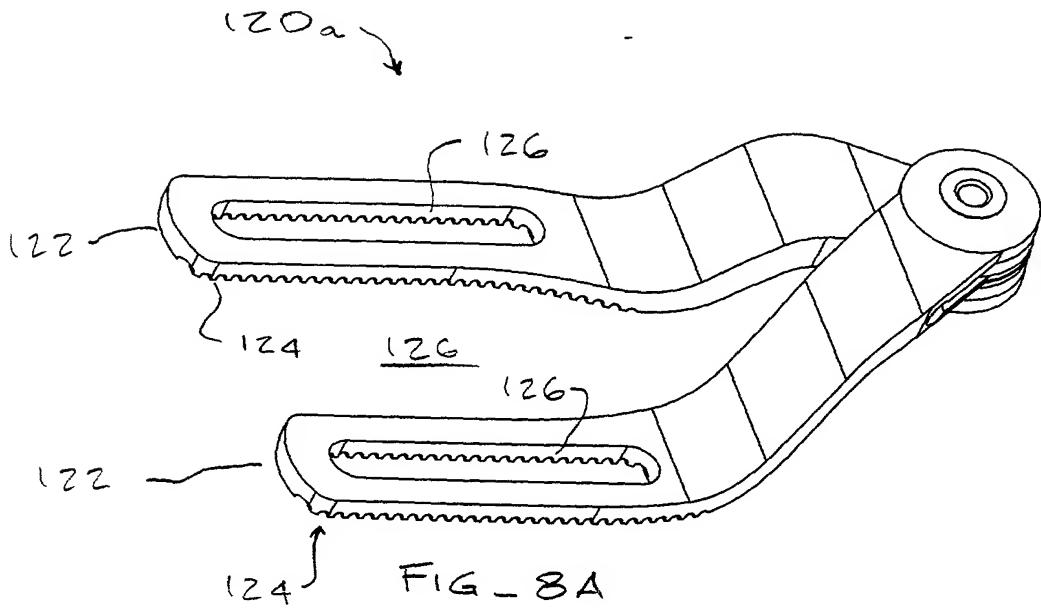


FIG - 6





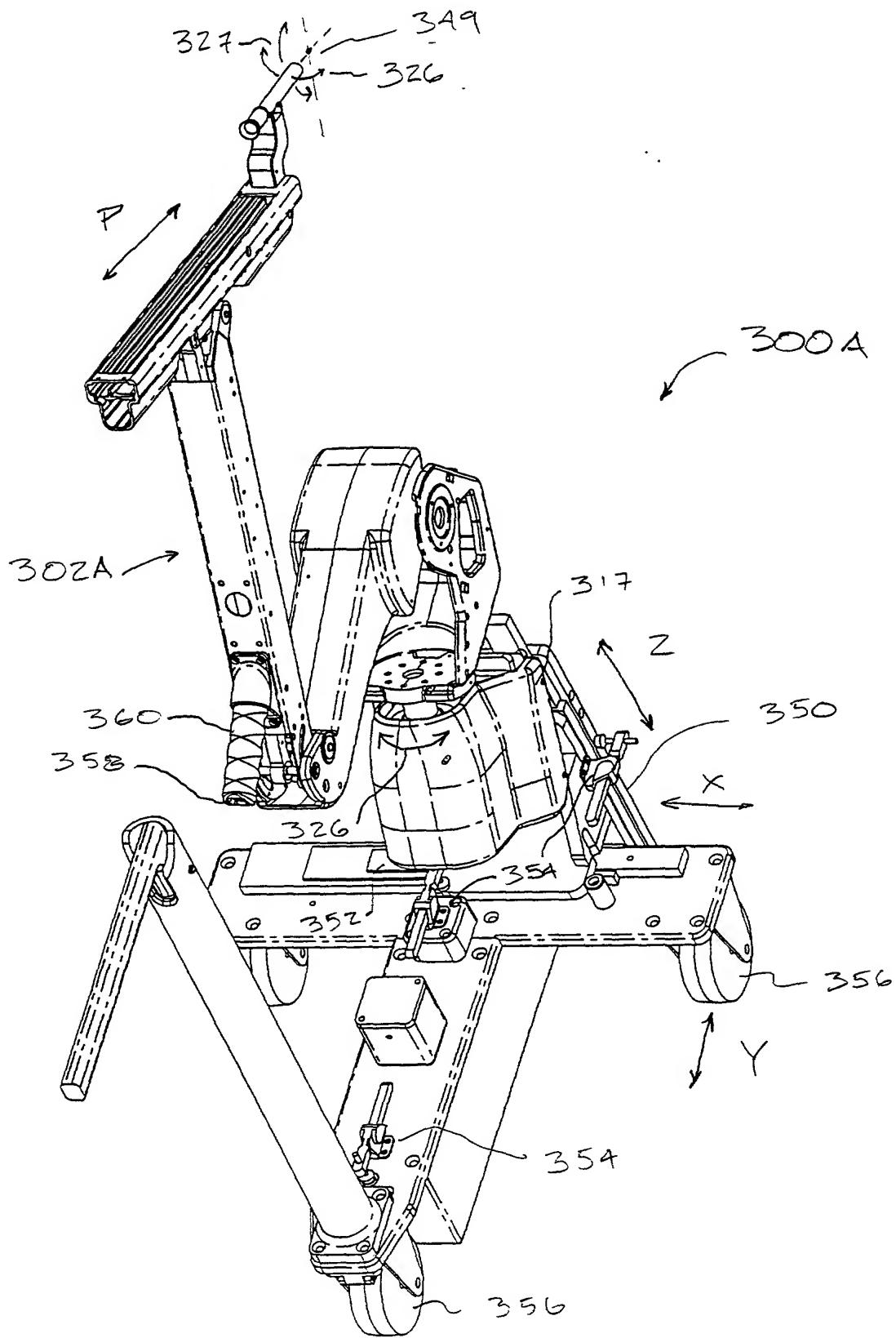


FIG - 9A

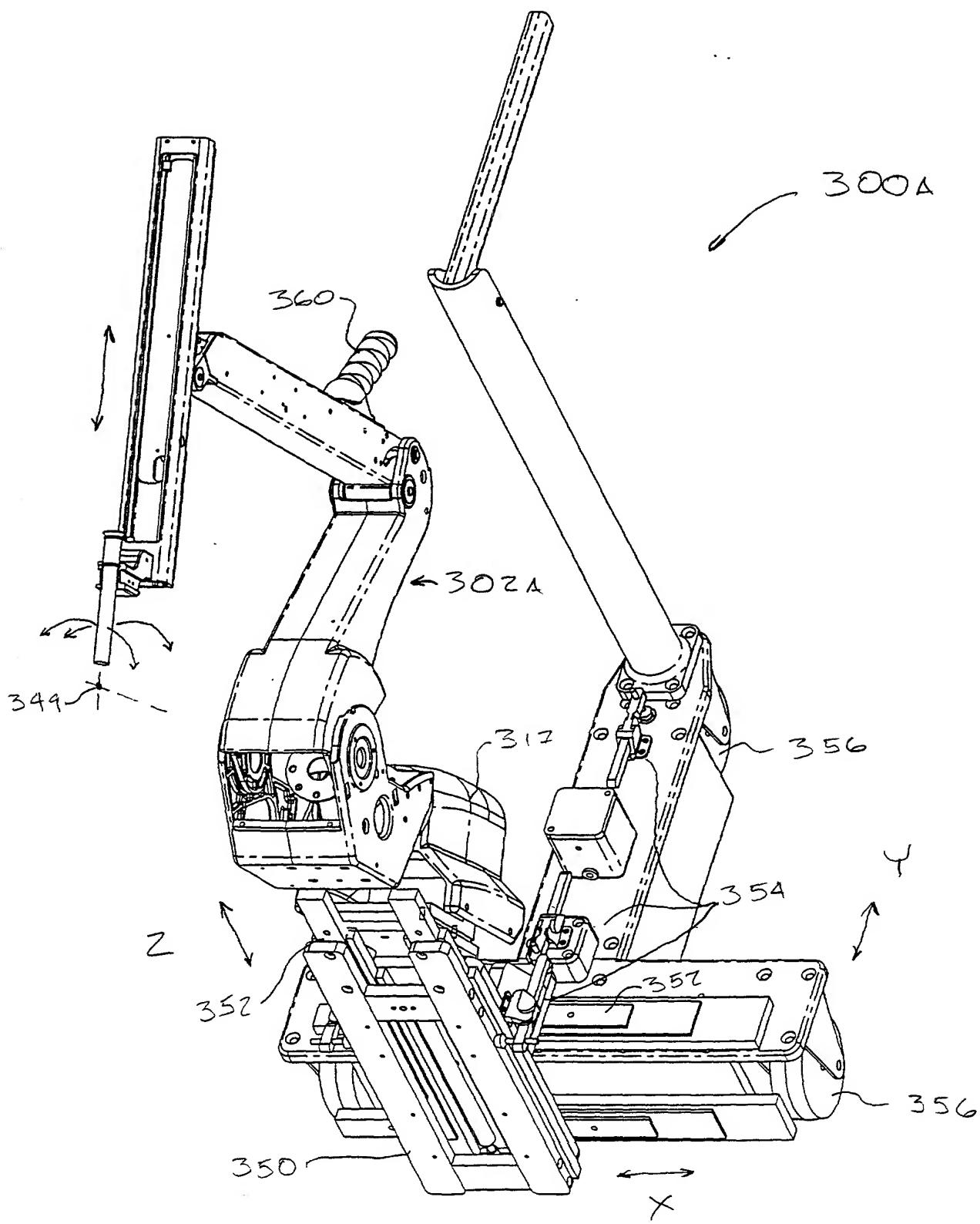
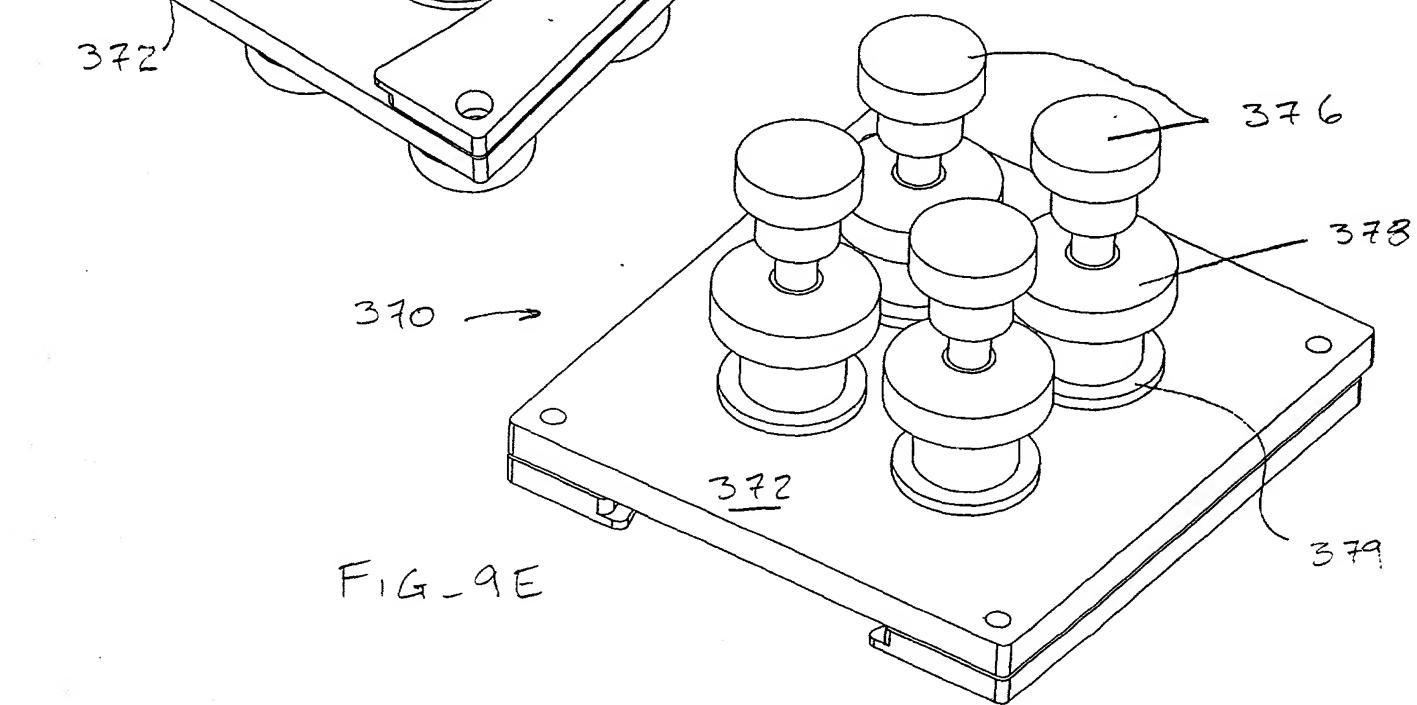
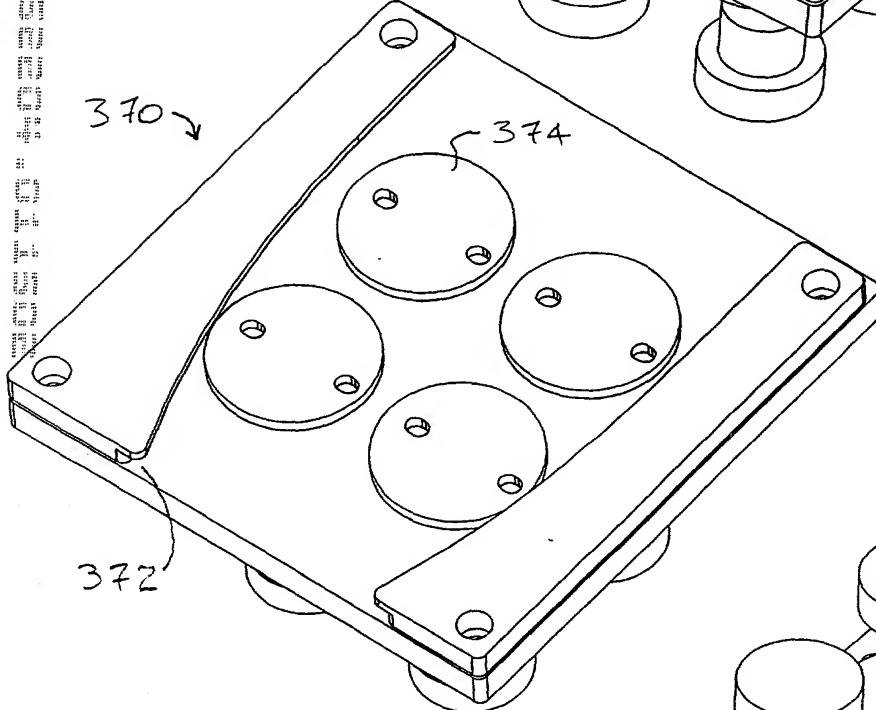
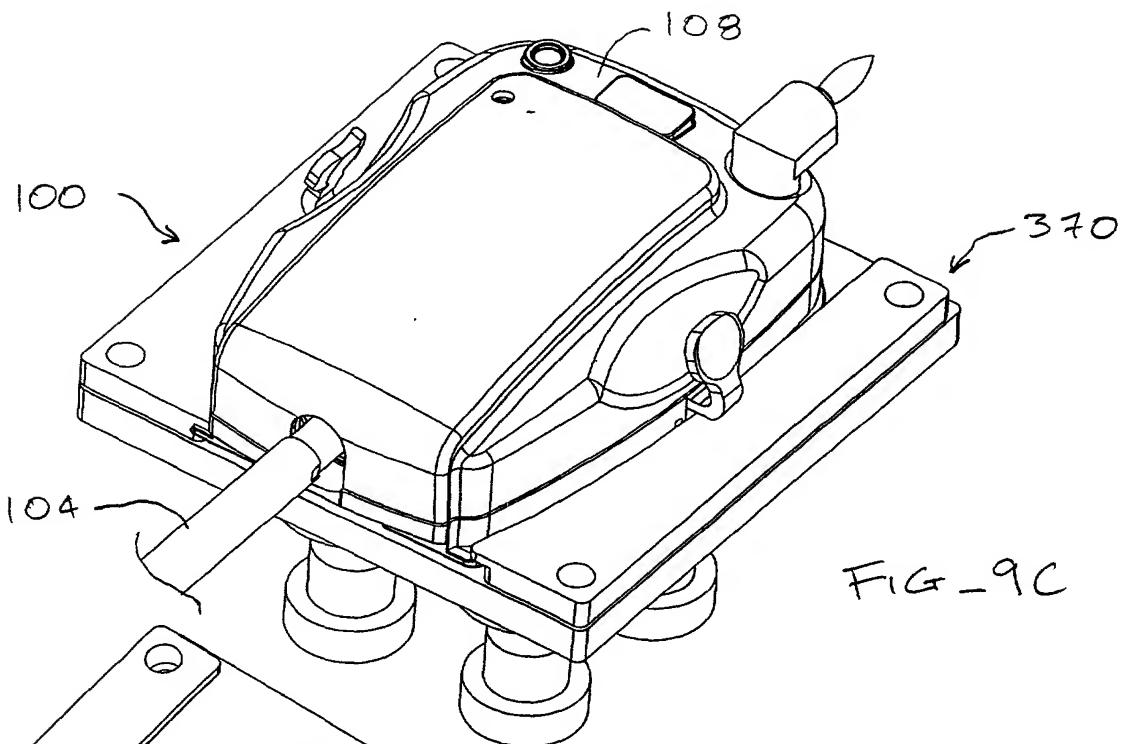


FIG - 9B



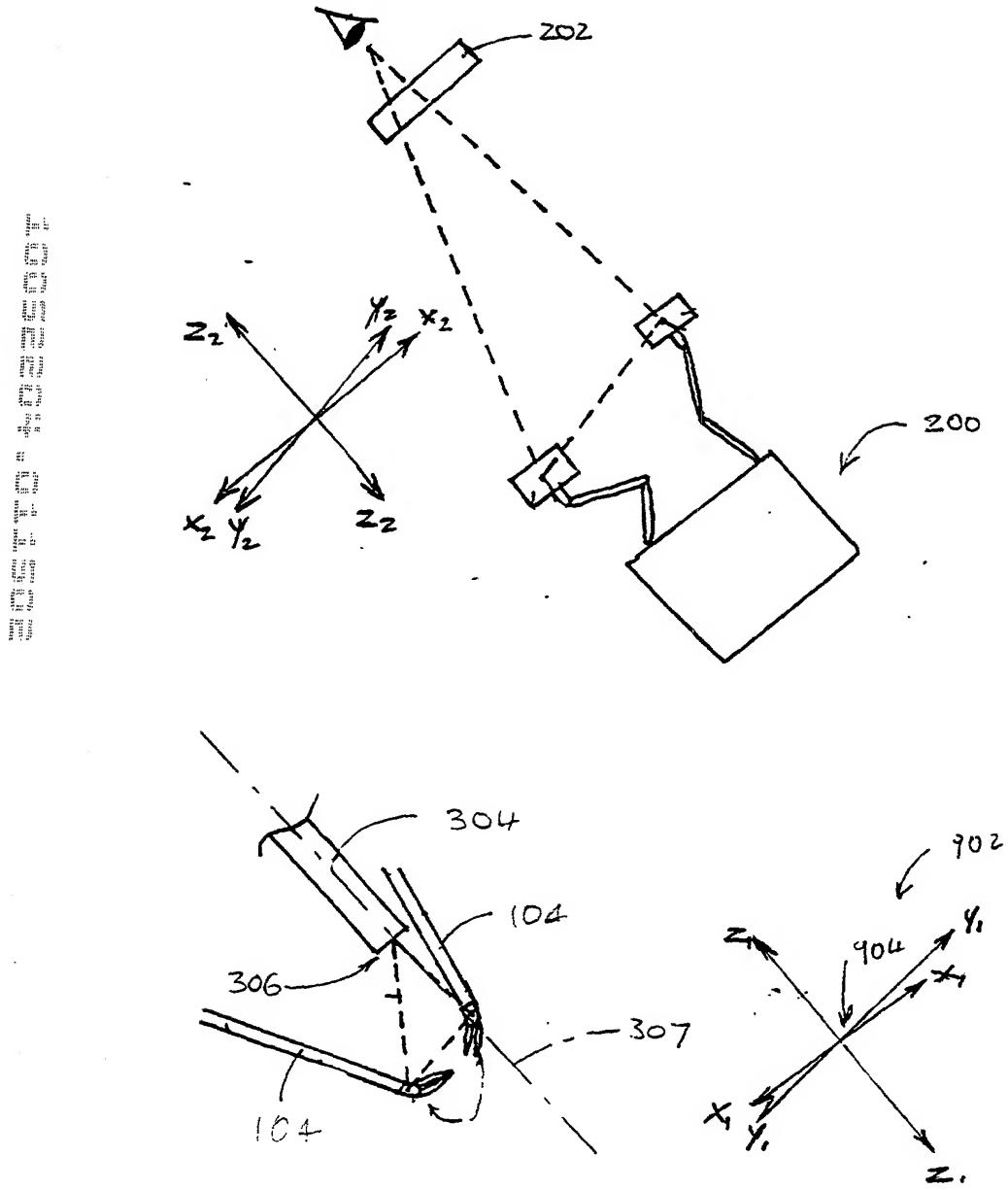
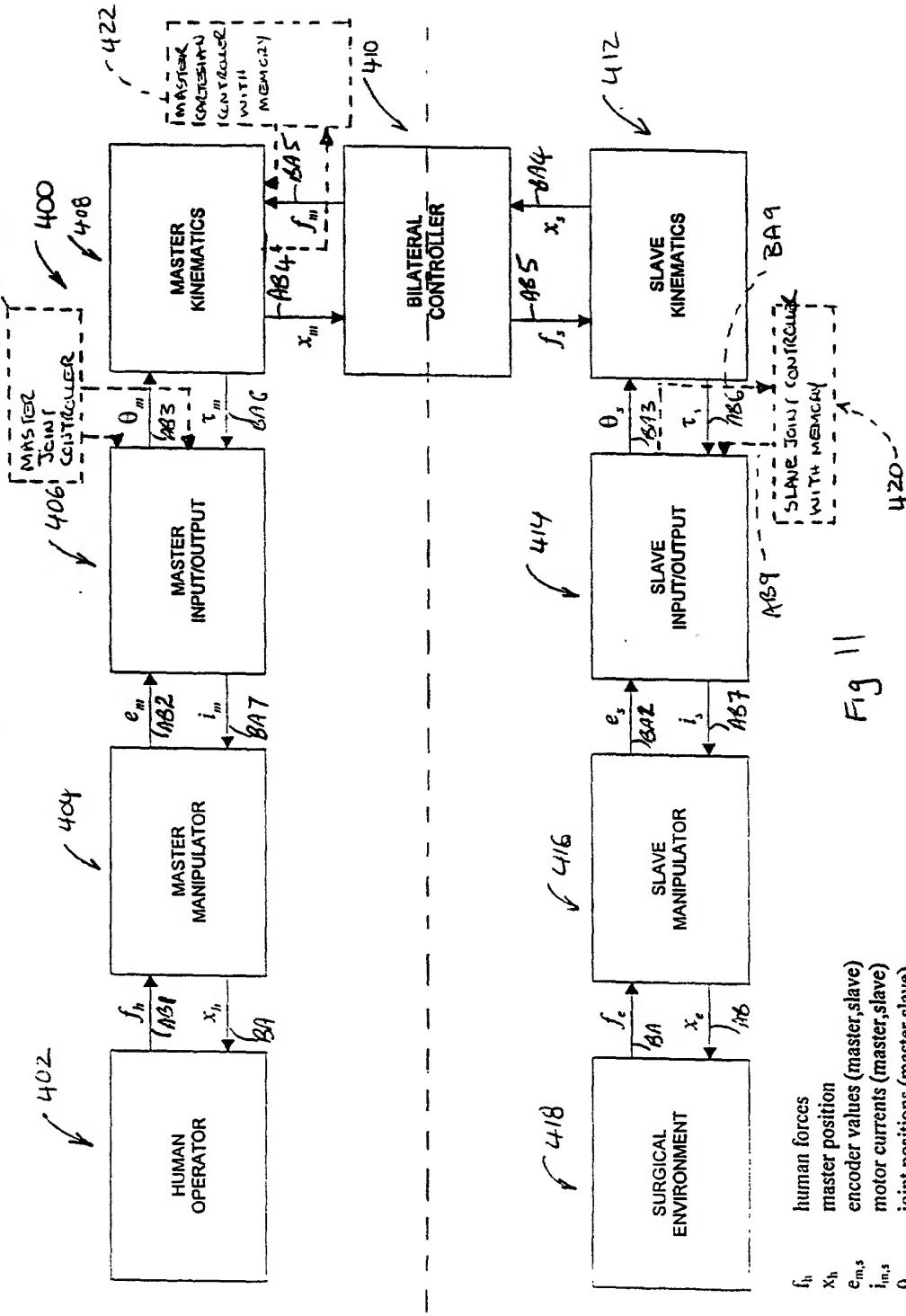


FIG - 10

HIGH LEVEL ARCHITECTURE OF MASTER/SLAVE CONTROL SYSTEM



f_h
 human forces
 x_h
 master position
 $e_{m,s}$
 encoder values (master,slave)
 $i_{m,s}$
 motor currents (master,slave)
 $\theta_{m,s}$
 joint positions (master,slave)
 $\tau_{m,s}$
 joint torques (master,slave)
 $f_{m,s}$
 cartesian forces (master,slave)
 $x_{m,s}$
 cartesian positions (master,slave)
 f_r
 environment forces

Fig 11

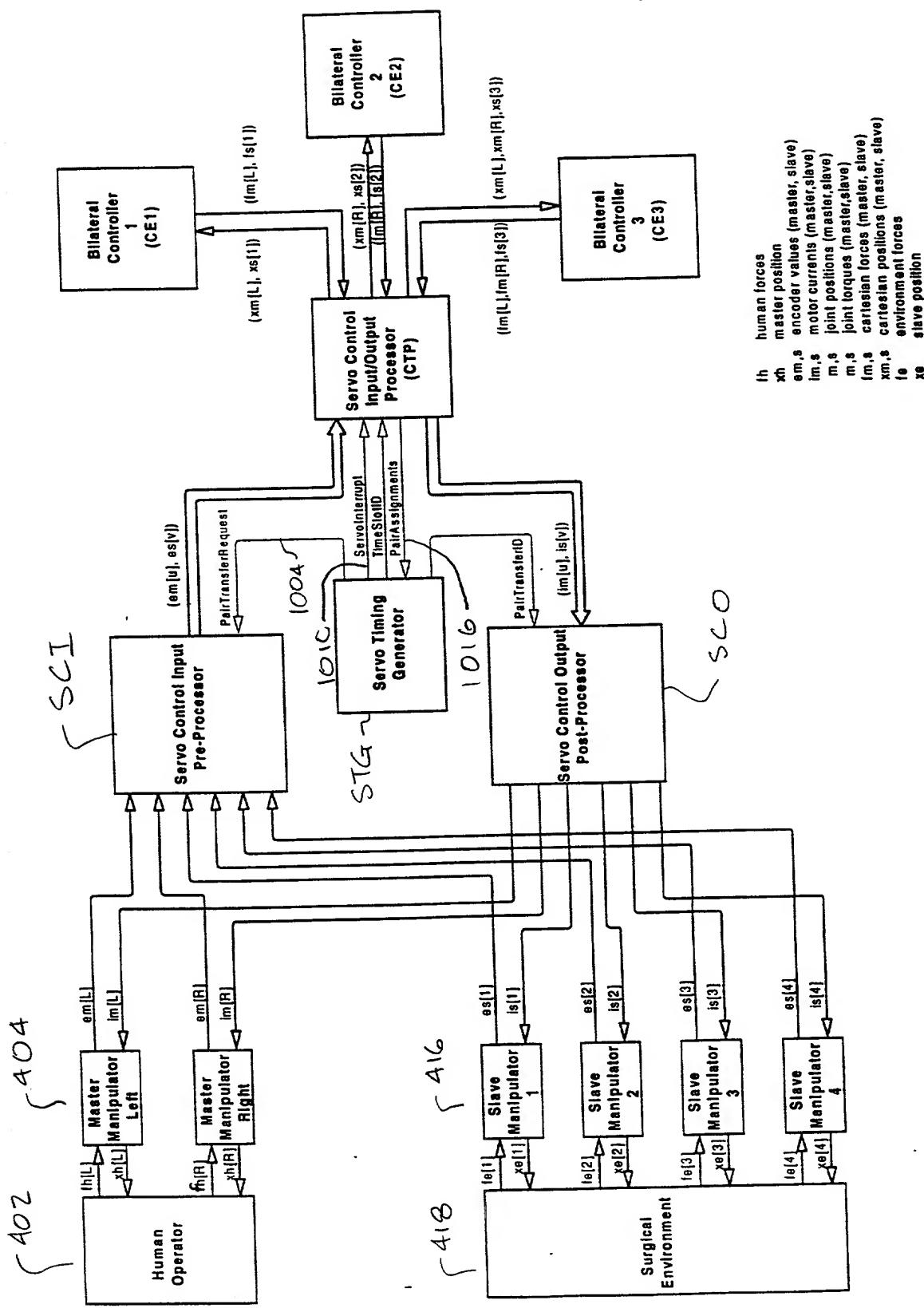
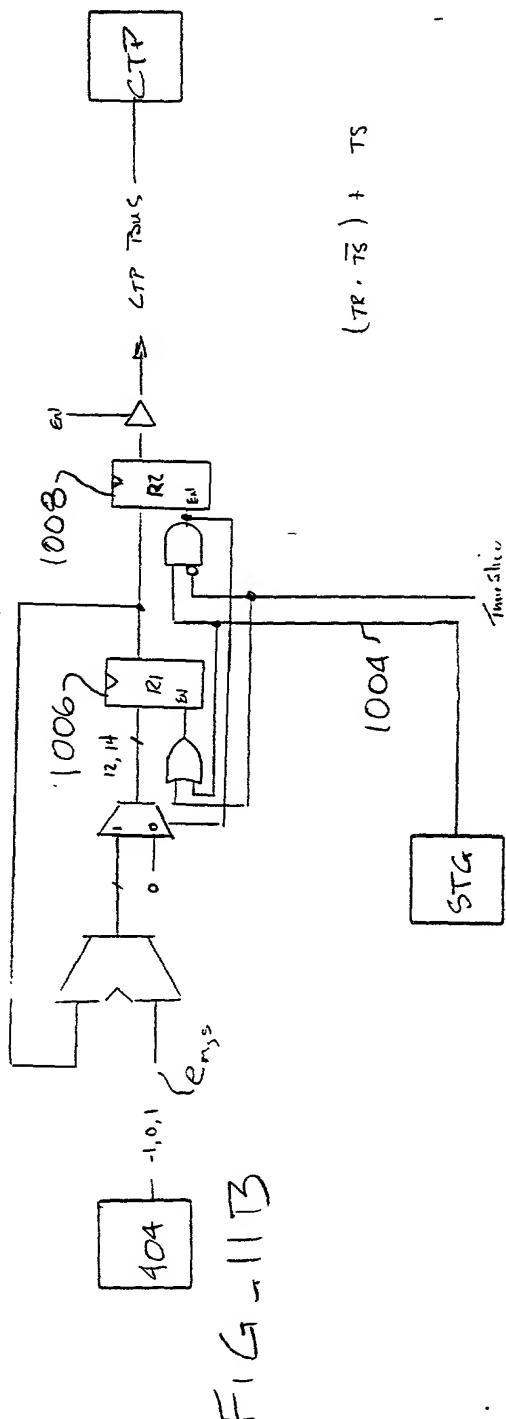


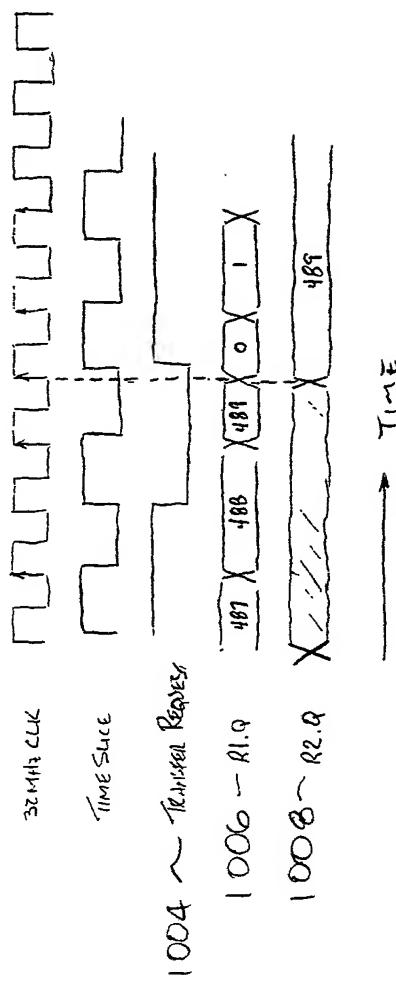
Fig - 11A

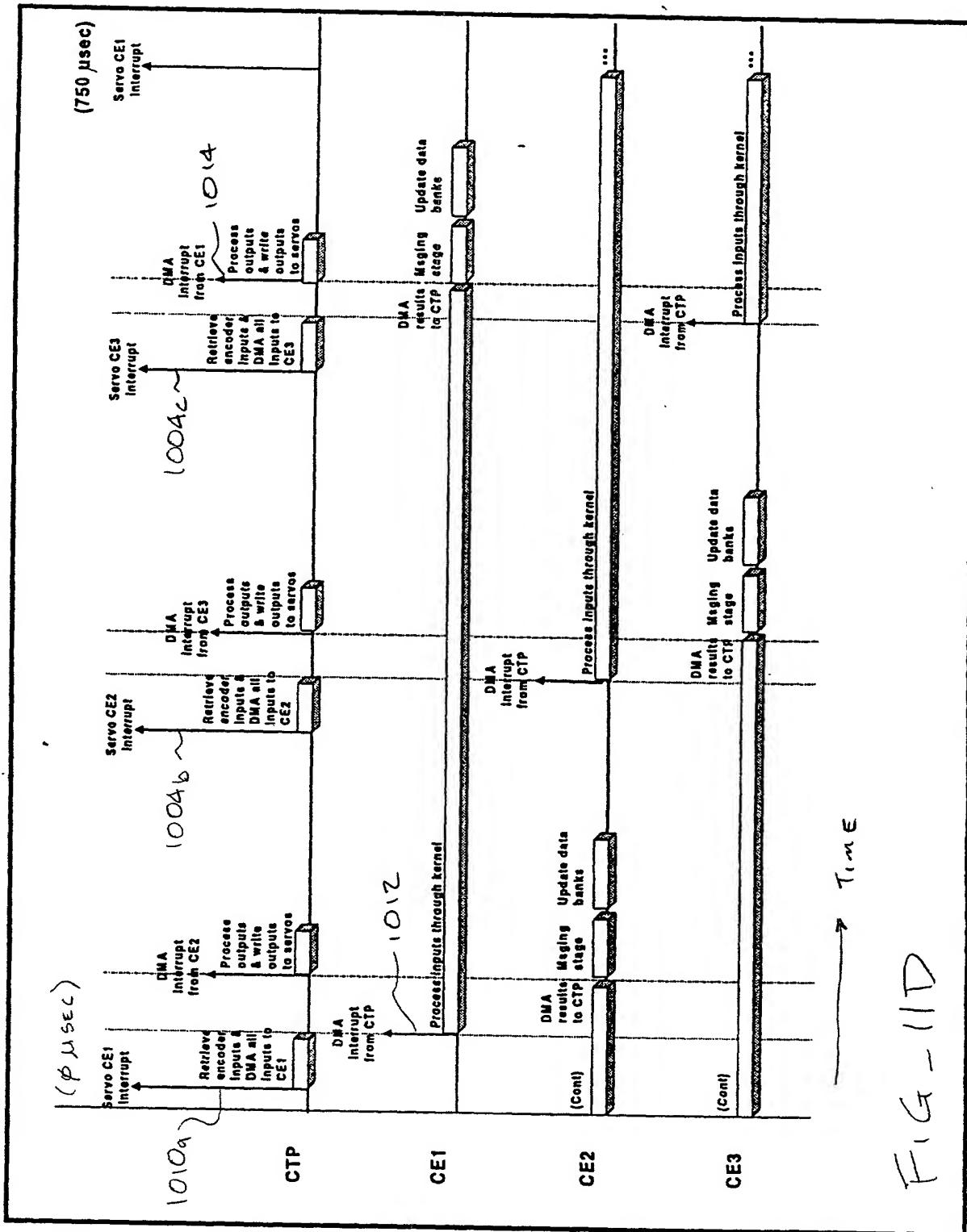
2001 ↘



$$TS = \tau_2 + \tau_1$$

Fig - 11C





MASTER RE-POSITIONING

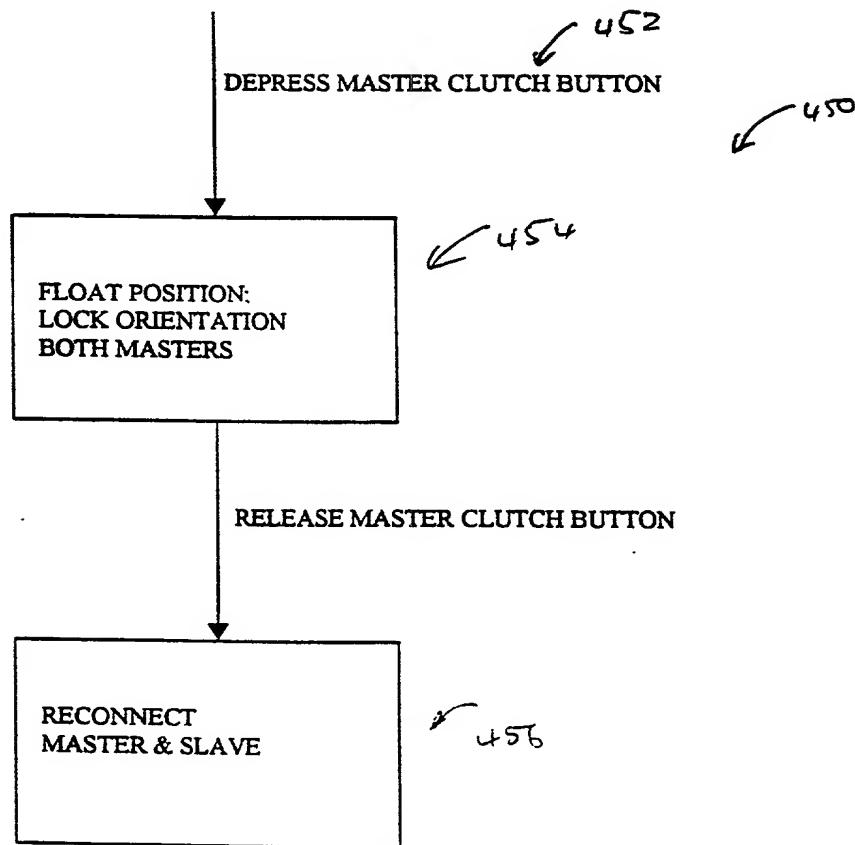


FIG 12

MASTER RE-POSITIONING

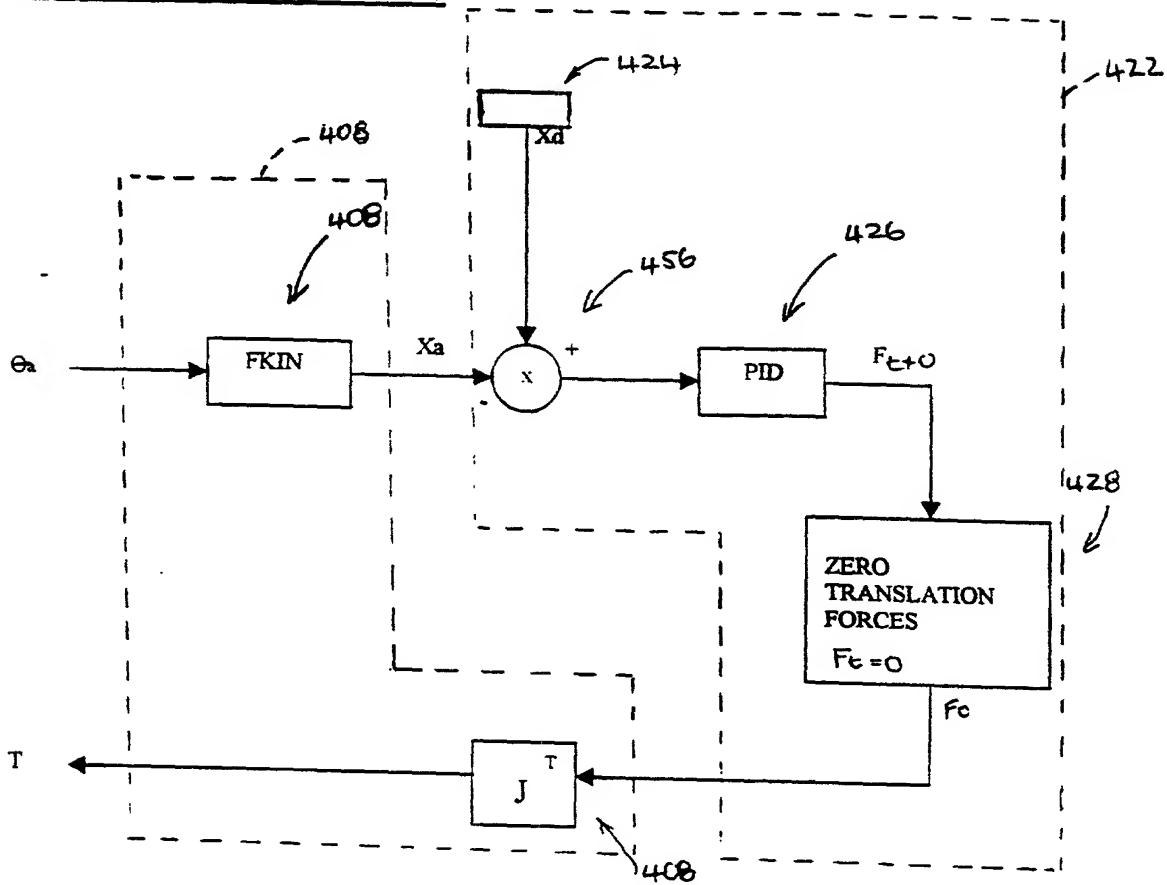


FIG - 13

SLAVE RE-POSITIONING

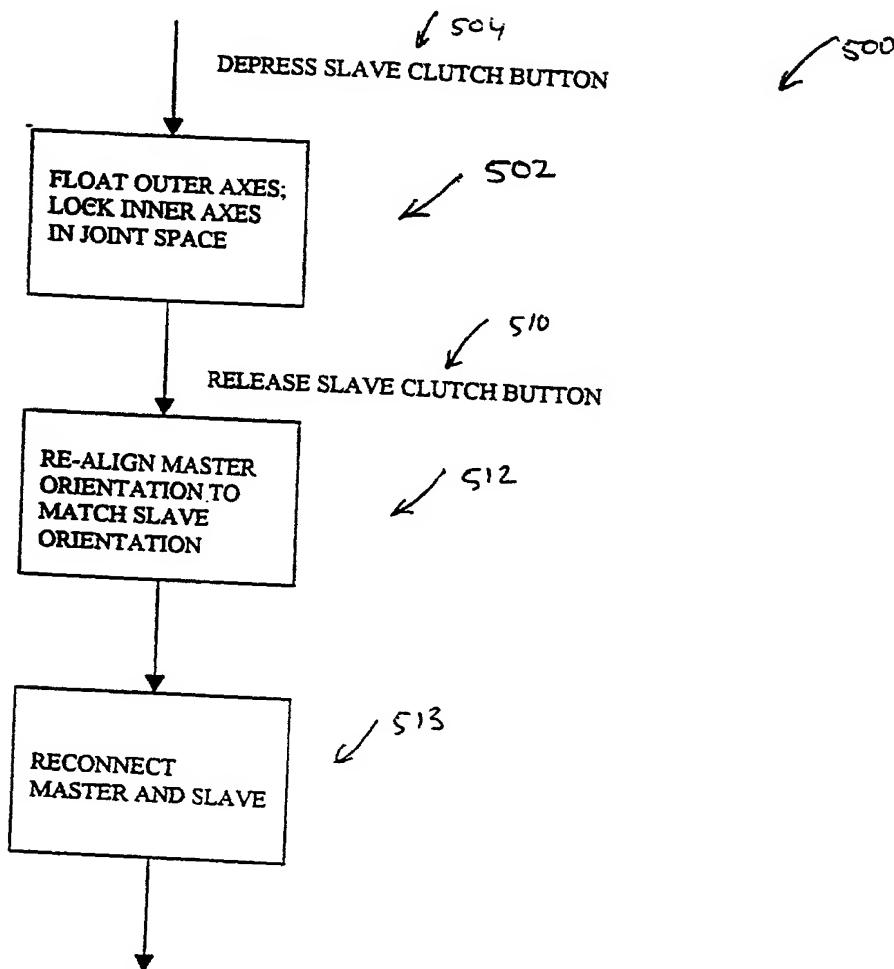


Fig 14

SLAVE RE-POSITIONING

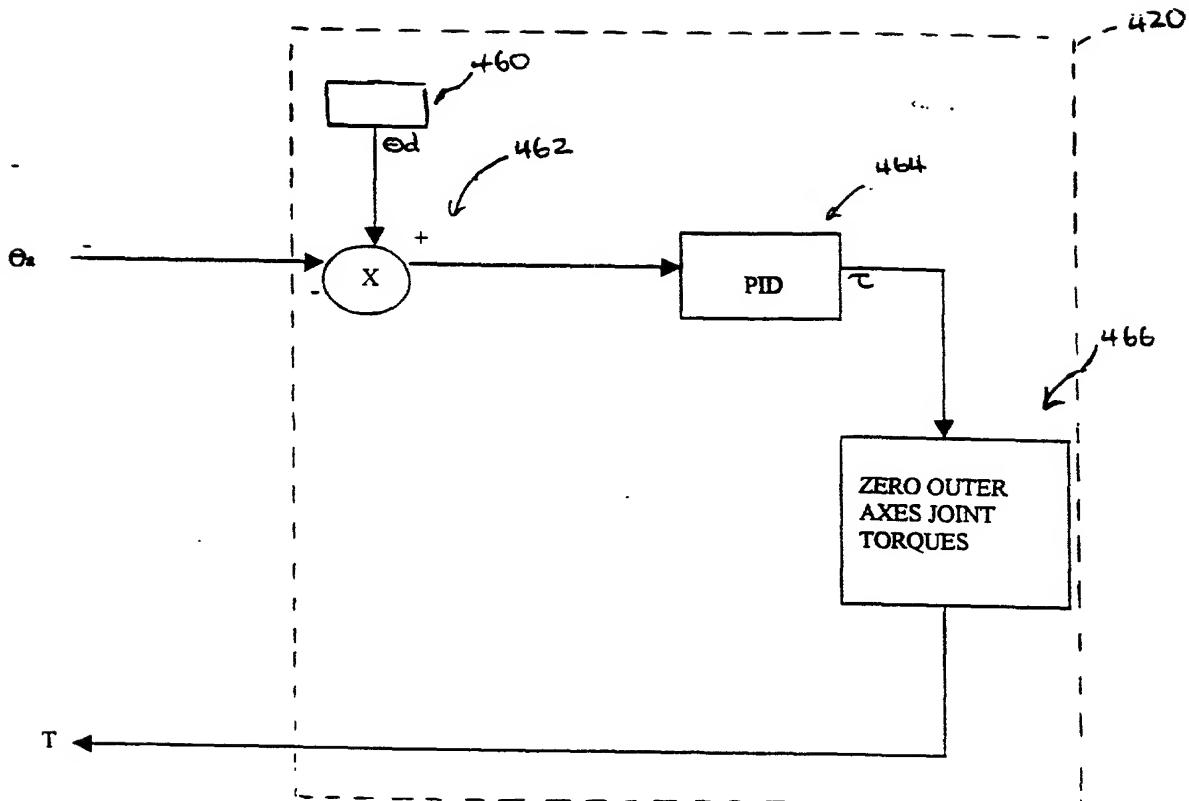


FIG-15

CAMERA RE-POSITIONING

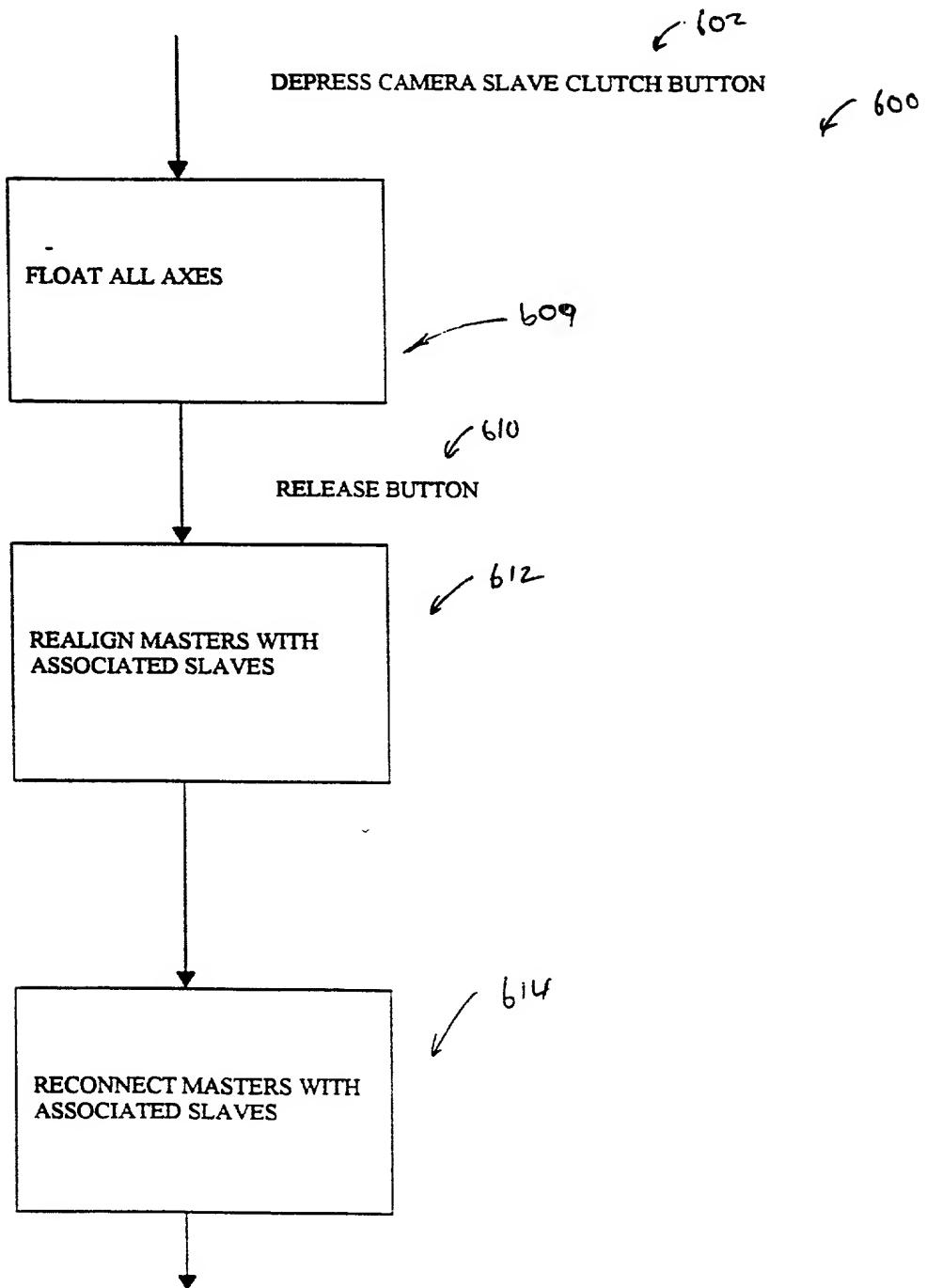


FIG - 16

CAMERA RE-POSITIONING

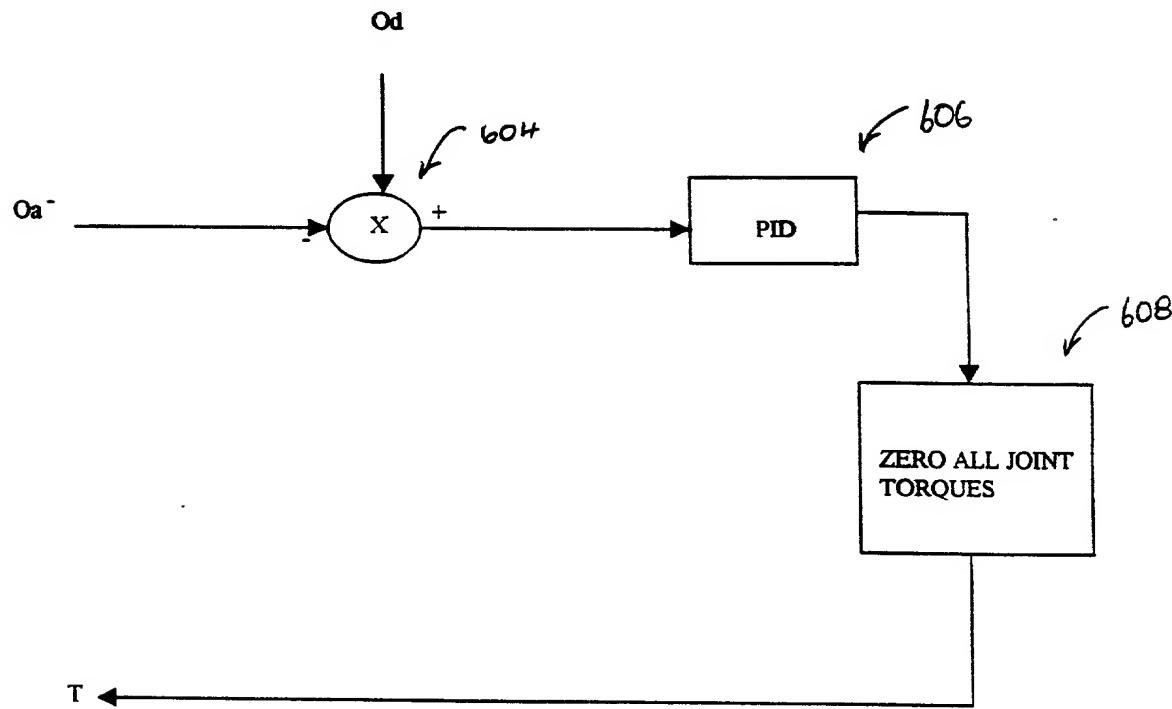


FIG - 17

MASTER ALIGNMENT

(FORCING MASTER ORIENTATION TO EQUAL SLAVE ORIENTATION)

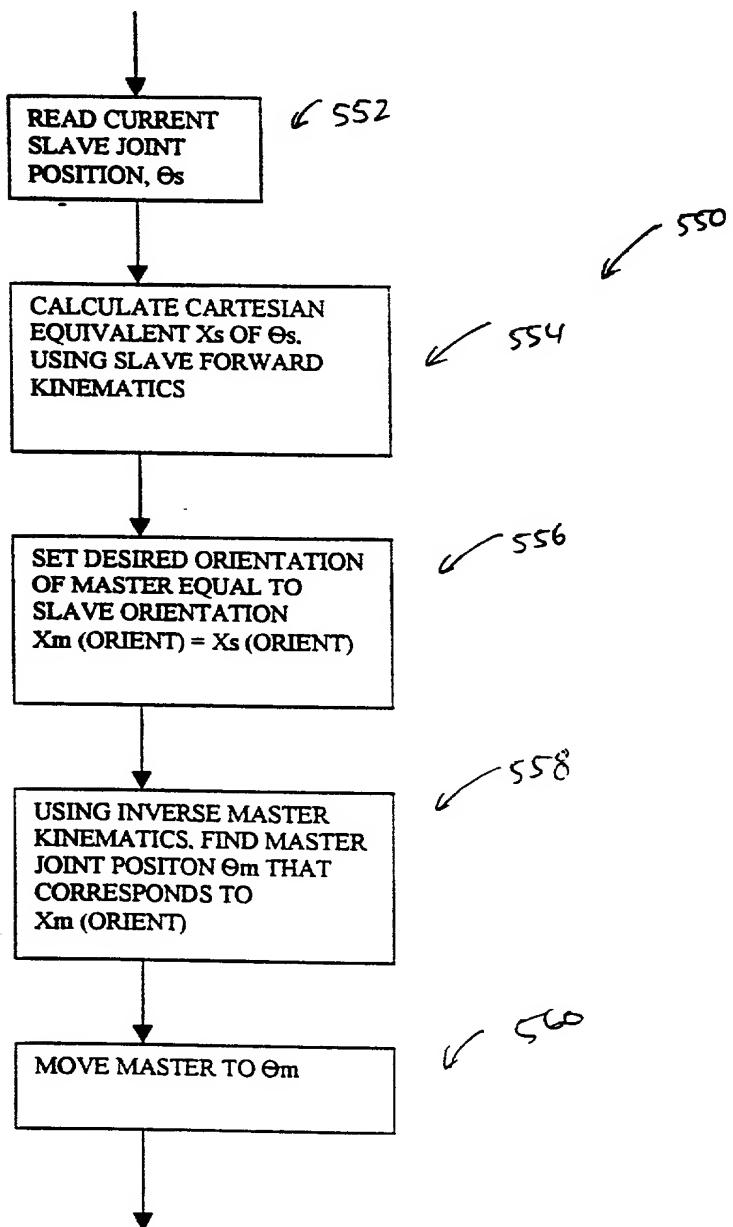


FIG-18

RE-CONNECTING MASTER AND SLAVE

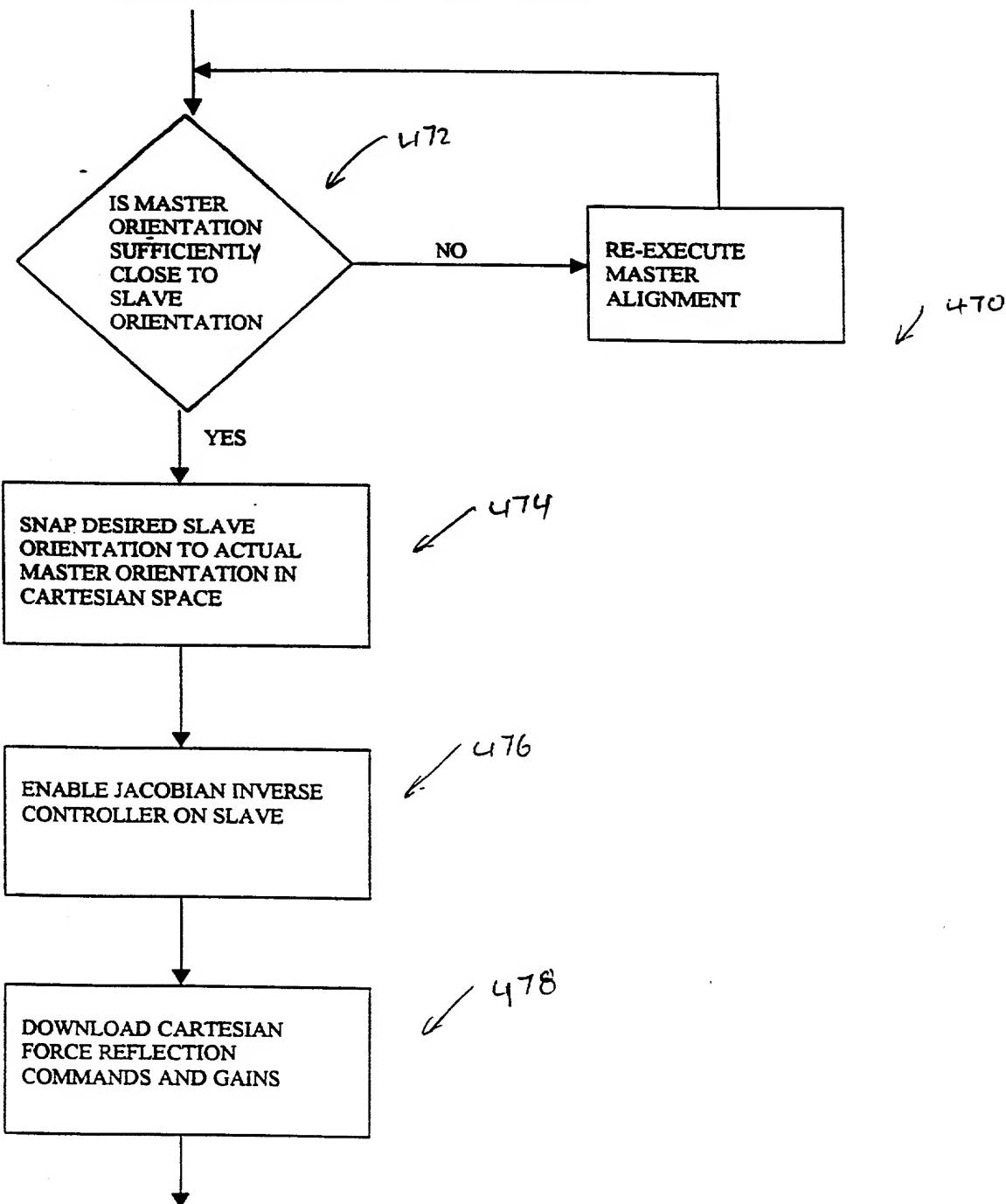


FIG - 19

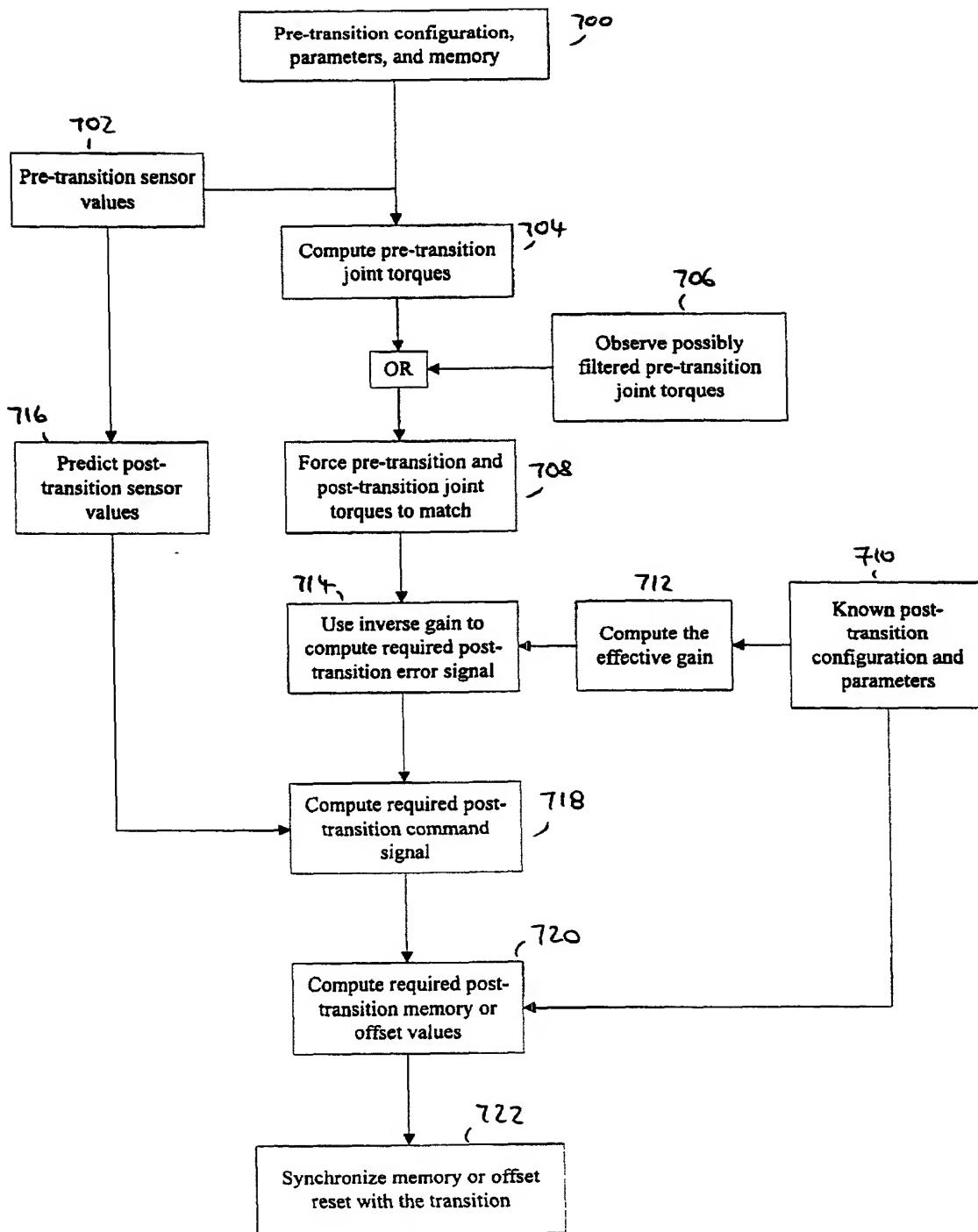


FIG - 19A

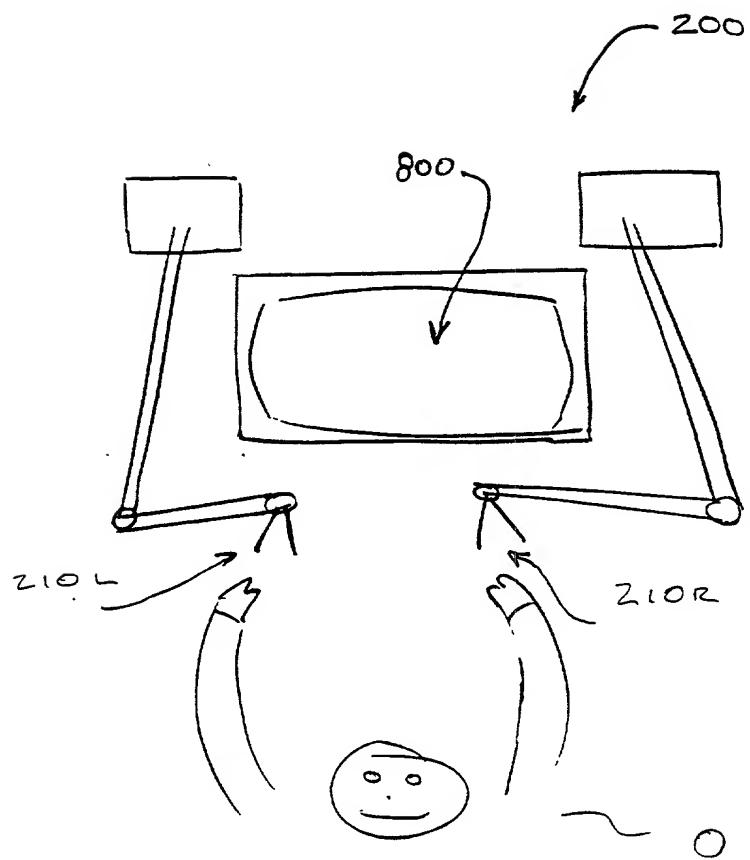
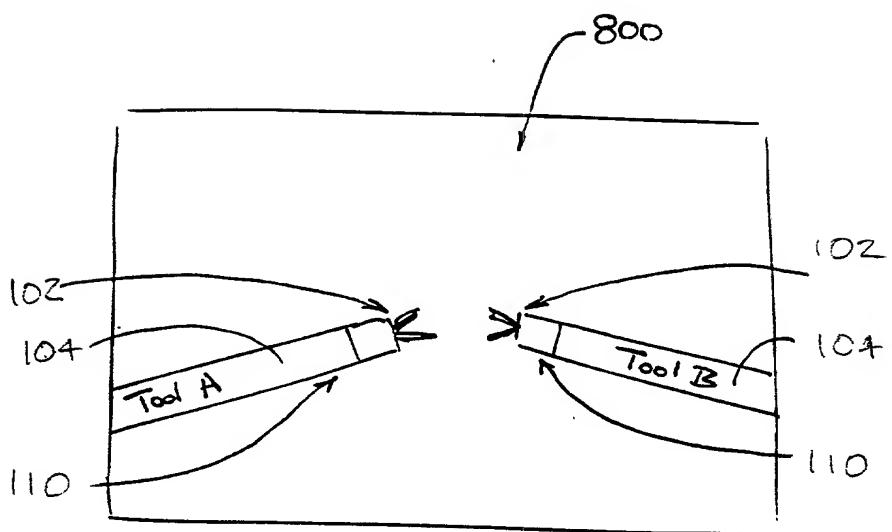
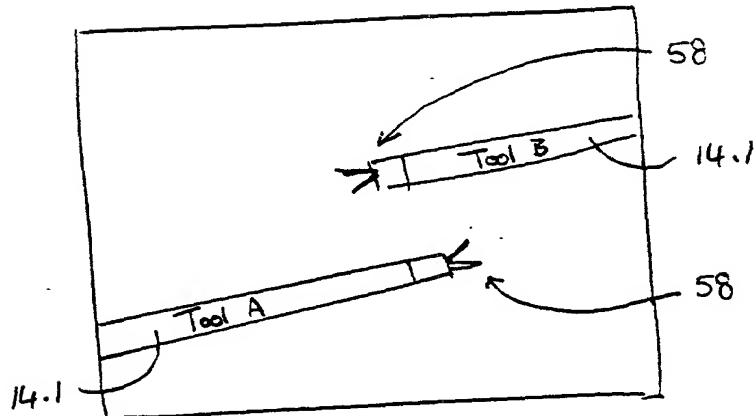


FIG - 20



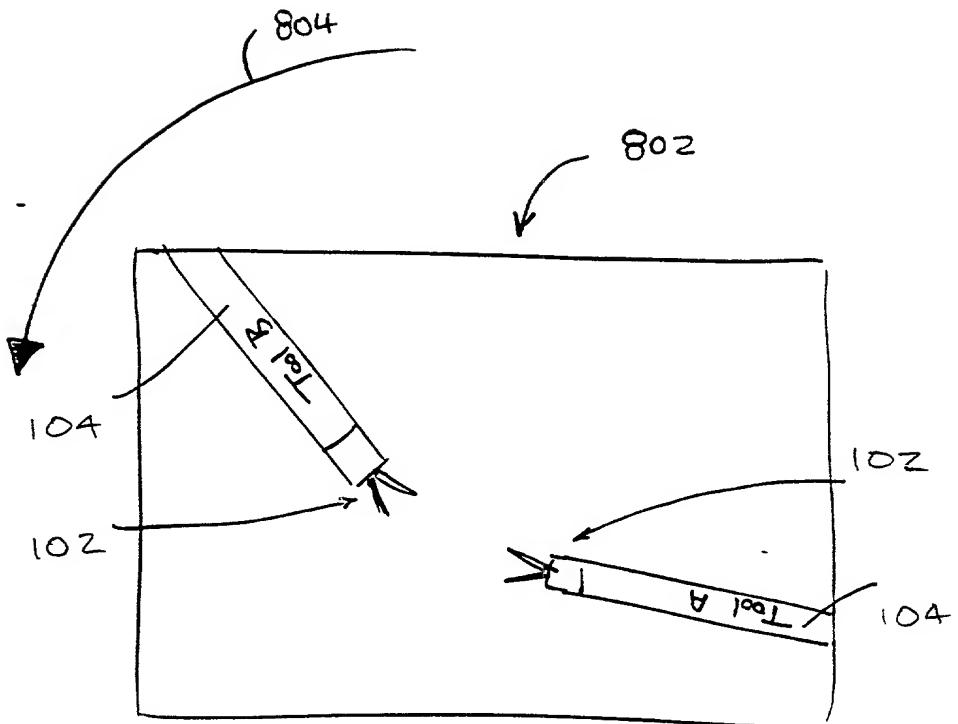
Associate Tool A ↔ Left Master
Tool B ↔ Right Master

FIG - 21



Associate Tool A ↔ Left Master
Tool B ↔ Right Master

FIG - Z1 A



Associate Tool A ↔ Right Master
Tool B ↔ Left Master

FIG-22

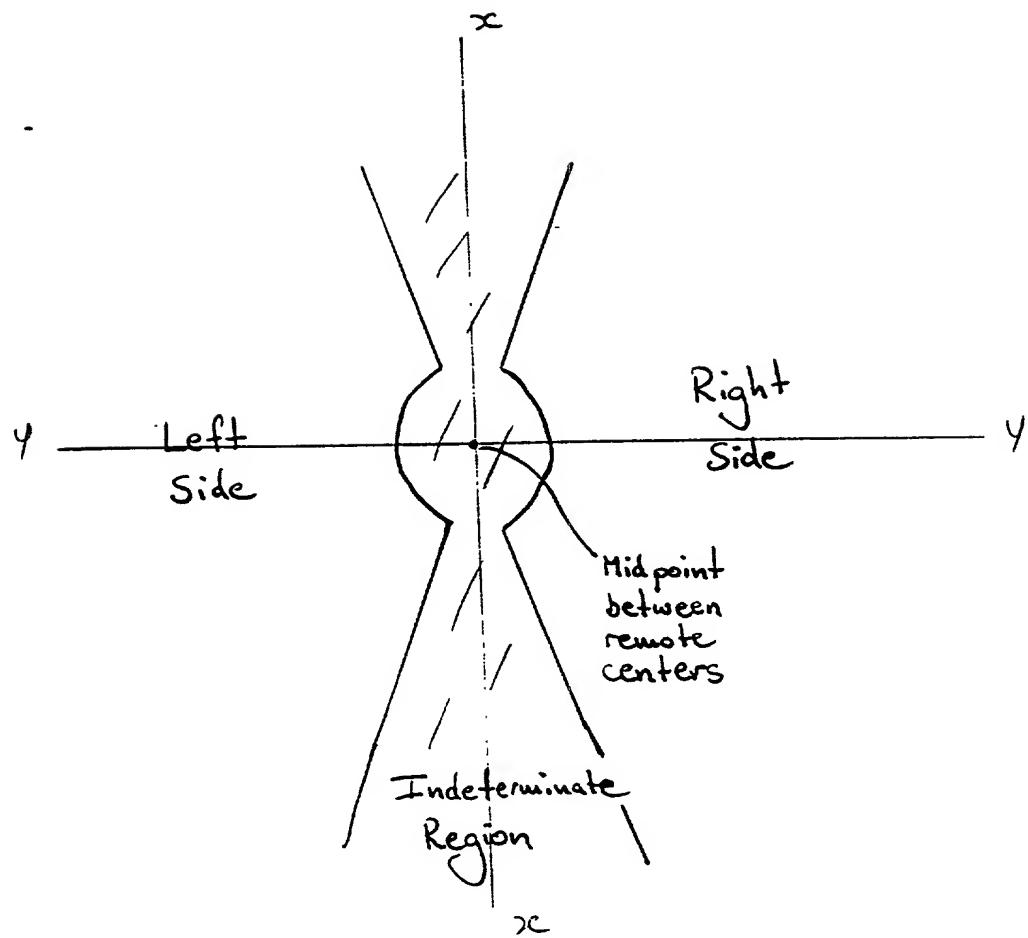
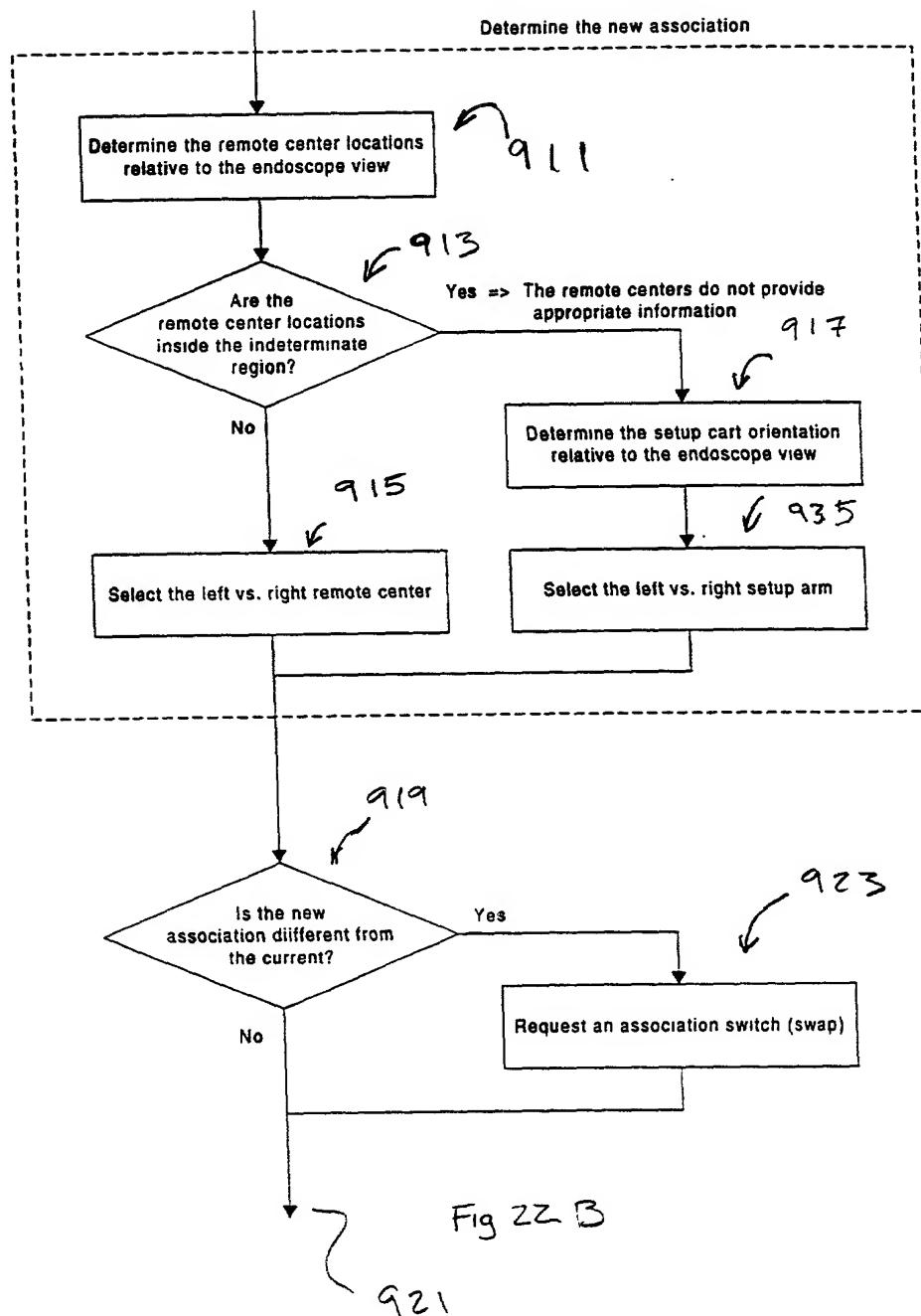


FIG - 22A



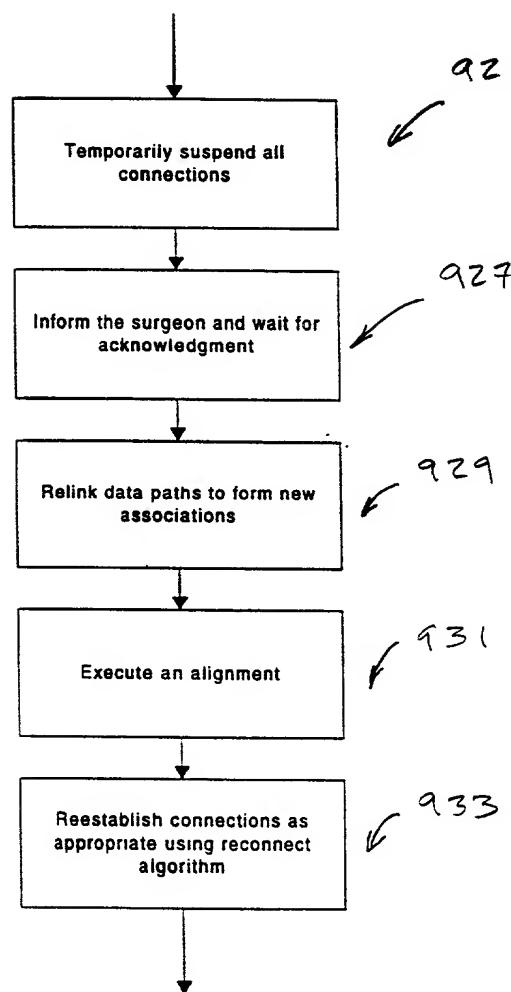


FIG - 22C

COPY

DECLARATION

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **REPOSITIONING AND REORIENTATION OF MASTER/SLAVE RELATIONSHIP IN MINIMALLY INVASIVE TELESURGERY** the specification of which _____ is attached hereto or X was filed on September 17, 1999 as Application No. 09/398,960.

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56. I claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application No.	Filing Date
60/116,891	January 22, 1999
60/116,842	January 22, 1999
60/109,359	November 20, 1998

I claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Date of Filing	Status
09/374,643	August 16, 1999	Pending

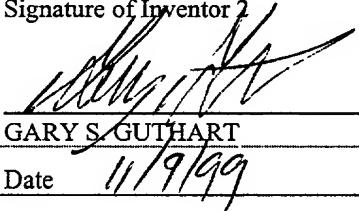
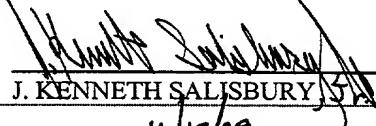
Full Name of Inventor 1:	Last Name: NOWLIN	First Name: WILLIAM	Middle Name or Initial: C.	
Residence & Citizenship:	City: Los Altos	State/Foreign Country: California	Country of Citizenship: United States	
Post Office Address:	Post Office Address: 1751 Oak Avenue	City: Los Altos	State/Country: California	Postal Code: 94024
Full Name of Inventor 2:	Last Name: GUTHART	First Name: GARY	Middle Name or Initial: S.	
Residence & Citizenship:	City: Foster City	State/Foreign Country: California	Country of Citizenship: United States	
Post Office Address:	Post Office Address: 732 Chebec Lane	City: Foster City	State/Country: California	Postal Code: 94404

COPY

Attorney Docket No.: 17516-001310

Full Name of Inventor 3:	Last Name: SALISBURY, Jr.	First Name: J.	Middle Name or Initial: KENNETH
Residence & Citizenship:	City: Atherton	State/Foreign Country: California	Country of Citizenship: United States
Post Office Address:	Post Office Address: 71 Manzanita Road	City: Atherton	State/Country: California Postal Code: 94027
Full Name of Inventor 4:	Last Name: NIEMEYER	First Name: GUNTER	Middle Name or Initial: D.
Residence & Citizenship:	City: Mountain View	State/Foreign Country: California	Country of Citizenship: Germany
Post Office Address:	Post Office Address: 111 N. Rengstorff Ave., #135	City: Mountain View	State/Country: California Postal Code: 94043

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor 1  WILLIAM C. NOWLIN	Signature of Inventor 2  GARY S. GUTHART	Signature of Inventor 3  J. KENNETH SALISBURY
Date Nov 6, 1999	Date 11/9/99	Date 11/13/99
Signature of Inventor 4  GUNTER D. NIEMEYER		
Date 11/9/99		

PA 3022496 v1

COPY

Attorney Docket No.: 17516-001310

POWER OF ATTORNEY BY ASSIGNEE

Intuitive Surgical, Inc., located at 1340 West Middlefield Road, Mountain View, California 94043, is the Assignee of the invention entitled:

REPOSITIONING AND REORIENTATION OF MASTER/SLAVE RELATIONSHIP IN MINIMALLY INVASIVE TELESURGERY

The specification of which _____ is attached hereto or X was filed on September 17, 1999 as Application No. 09/398,960.

The Assignment accompanying this Power of Attorney has been reviewed by the undersigned. The undersigned certifies that to the best of the undersigned's knowledge and belief, title is in the Assignee. The undersigned (whose title is supplied below) is empowered to act on behalf of the Assignee.

Assignee hereby appoints the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

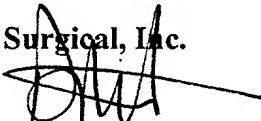
James M. Heslin, Reg. No. 29,541
Gary T. Aka, Reg. No. 29,038
Robert C. Colwell, Reg. No. 27,431
Paul C. Haughey, Reg. No. 31,836
David N. Slone, Reg. No. 28,572
William M. Smith, Reg. No. 30,223
Karen B. Dow, Reg. No. 29,684
Margaret A. Powers, Reg. No. 39,804

Darin J. Gibby, Reg. No. 38,464
Mark D. Barrish, Reg. No. 36,443
Joe Liebeschuetz, Reg. No. 37,505
James F. Hann, Reg. No. 29,719
Randolph T. Apple, Reg. No. 36,429
John R. Storella, Reg. No. 32,944
David R. Heckadon (Granted Limited Recognition under 37 CFR § 10.9(b))

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Two Embarcadero Center, 8th Floor
San Francisco, CA 94111-3834

Direct Telephone Calls to:
Mark D. Barrish
Reg. No. 36,443
(650) 326-2400

Date: 11/11/99

By: 
David Shaw

Title: Chief Patent Counsel

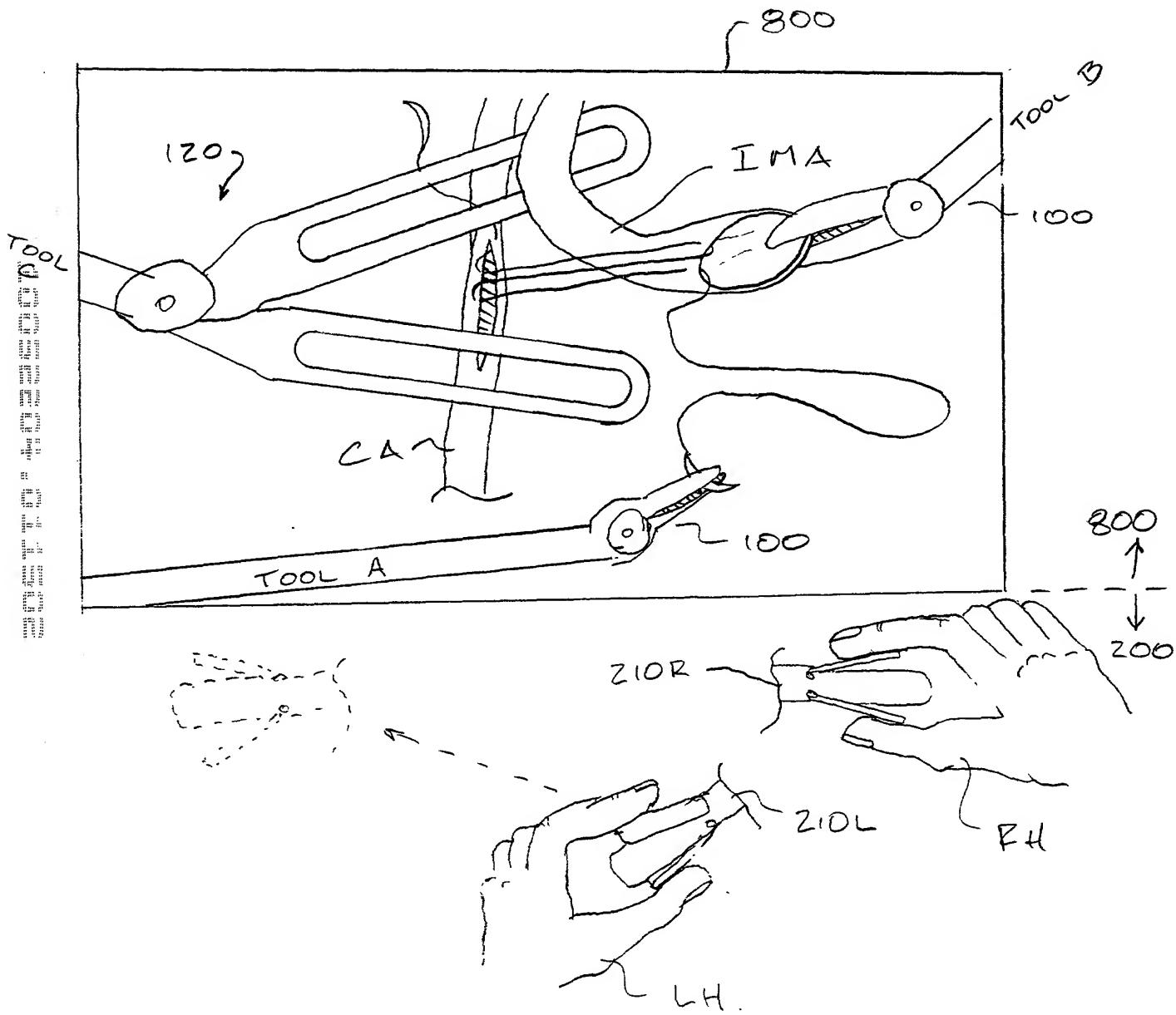


FIG-23A

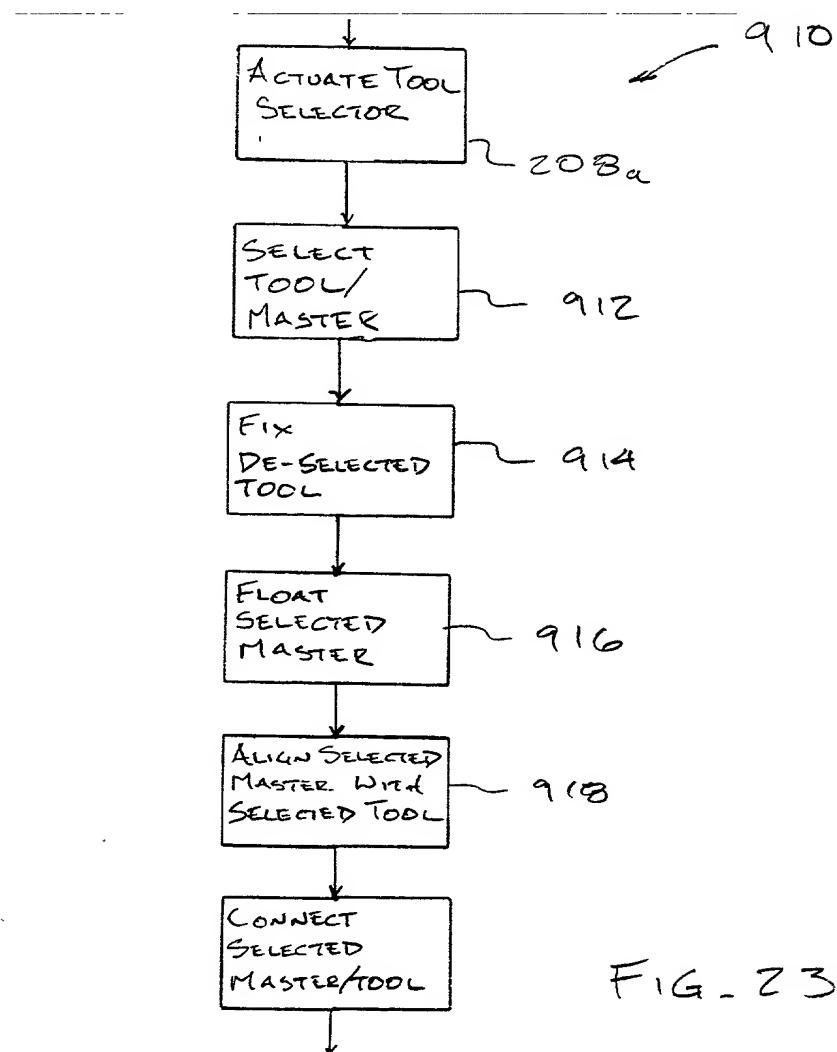


FIG - 23B

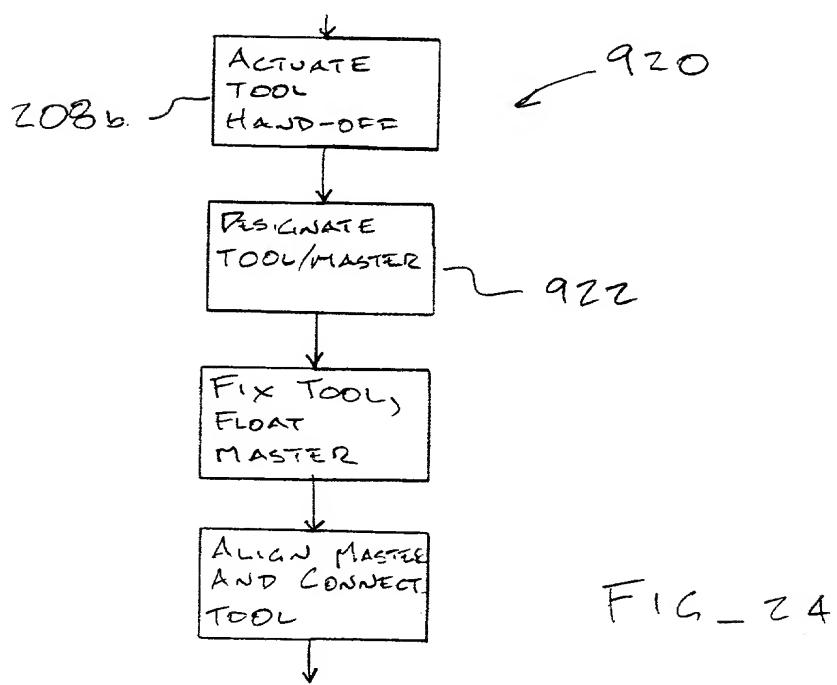


FIG - 24

